AD-725996

TECHNICAL REPORT NO. 71-04

COMPREHENSIVE LAW & ORDER ASSISTANCE RESEARCH AND DEVELOPMENT (CLOARAD) PROGRAM

Final Report
(Revised)

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March 1971

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ABSTRACT

The Comprehensive Law & Order Assistance Research and Development (CLOARAD) Program was concerned with hardware and tactics of potential value to military forces assigned to help control civil disturbances. The Program was a small-scale attempt to evaluate specific tactical problems and requirements imposed on military forces in disturbances. Within the restrictions of scarce data and time, manpower and funding limitations, this report delineates the most important problems identified during the Program and presents guidelines for the solution of these problems. Two firm recommendations are made in the report: (1) there should be comprehensive systems analyses to determine the best feasible solutions for the problems stated in the report; and (2) there should be a larger-scale, intensive effort to assemble and analyze pre-defined data on civil disturbances.

PREFACE

This report is a revised version of an earlier report and is concerned with a difficult and sensitive issue: military assistance in the control of civil disorder. It is likely to be somewhat controversial because its subject is one about which nearly everyone has already formed fixed opinions; because the interests of various groups officially involved in the problem differ; and because the methods for studying civil disturbance control problems are now and probably always will be rather inexact.

The CLOARAD study attempted to minimize controversy by: (1) employing experienced personnel to gather and analyze data; (2) by reviewing both official and unofficial documents and obtaining the views of military personnel at several command levels; and (3) by stating its findings only as strongly as the data would permit and basing them on past actions as distinct from plans and intentions.

This CLOARAD report does not present a major breakthrough or discovery. Many of the ideas contained in the following pages are already stated in official publications. However, there are good reasons for repetition. Some existing plans and doctrines which may answer requirements in this report have not been fully and successfully implemented, and implementation should be encouraged. Some advances in control methods used by one military organization should be made standard for other organizations as well. There are general doctrines which need to be developed in greater detail in response to specific problems discussed here. Finally, there is the simple need to list all the aspects of a problem, both solved and unsolved, so that they will be recognized and considered as a whole.

There is an attempt here to foresee which aspects of present civil disturbance control problems will persist in the future, and which aspects are likely to change. There is also an attempt to distinguish the ways in which control methods deserve not only technical but also tactical improvements. Finally, there is an emphasis here that control problems cannot be sharply separated into military and civilian responsibilities, but require the active cooperation of both kinds of authorities.

Although the CLOARAD Program represented a small-scale research effort, to our knowledge there has been no other comparable program in this area. The major contribution of the CLOARAD Program may be to stimulate more thorough investigation of the practical requirements of the military civil disturbance mission. Certainly, the detailed and thoroughly corroborated findings needed for more responsive planning and development will demand carefully focused and systematic research on specific control problems. To ignore this demand is to risk costly mistakes in the future.

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I. INTRODUCTION

The Comprehensive Law & Order Assistance Research and Development (CLOARAD) Program was concerned with military assistance to civil authorities in the control of civil disturbances. The Program served to identify urgent problems and issues affecting military assistance. These problems and issues have emerged from the review and analysis of large numbers of official and unofficial documents on civil disturbances, and from discussions with National Guard personnel at several command levels. From the many problems facing a military commander in a civil disturbance, the few listed here are judged to deserve attention because they appear to present continual challenges to control forces. Eighteen specific problems are discussed in this report.

Analysis of assembled information has suggested criteria which could serve as general guidelines for improving hardware and tactics for dealing with the control problems. These criteria are intended to have three functions. They can serve as rough measures for evaluating current responses to control problems. They can point out which features of existing or planned control methods should be implemented or improved most rapidly and universally. Finally, they can serve as general standards for the development of new hardware and tactics, and as a basis for the establishment of more detailed and meaningful criteria.

This report also discusses potential solutions to each of the specific control problems. However, the report stops short of making positive recommendations for using or developing particular equipment and tactics. The absence of these recommendations contrasts with the initial goal of the CLOARAD Program, which was to analyze military involvement in civil disturbances in a way that would produce detailed definitions of needed control hardware and tactics. To understand why the original goal was not achieved, it is necessary to briefly review the history of the CLOARAD Program.

The CLOARAD Program originated in a request from the Office of the Director of Defense Research and Engineering (ODDR&E). Because civil authorities have continued to request military assistance in dealing with civil disorder, ODDR&E desired to know more about the hardware and tactics required by troops providing such assistance. The ODDR&E request went to the US Army Land Warfare Laboratory (LWL) because of its experience at analyzing civil distur-

bance control concepts in an earlier program*. LWL responded with a proposal which became the basis for the CLOARAD Program. ODDR&E set a nine-month deadline for the Program and provided guidance for the selection of expert assistance for the research.

CLOARAD was not the first attempt to analyze military tactical and equipment requirements for controlling civil disturbances. A unique feature of the CLOARAD Program, however, was an effort to make the fullest possible use of statistical data on recent civil disturbances. A concerted attempt was made to gather all the available documented facts about spontaneous outbreaks of disorder which have already occurred, and which are related to the more organized violence which could occur more frequently in the future. The information, assembled at a data collection center, was to be used as a factual basis for formulating hypotheses and conclusions about civil disturbances, which would lead to the CLOARAD recommendations.

Much of the work of CLOARAD was carried out by contractor teams: two special research teams and the staff of a data collection center. A special research team at Arthur D. Little, Incorporated (ADL), headed by Mr. Arnold Sagalyn, was assigned to analyze low-level disturbances, those which are characteristically spontaneous and disorganized and which are the focus of present Army civil disturbance control methods. A special research team at General Research Corporation (GRC), headed by Mr. Zoltan Pazmany and Dr. John Sorenson, was assigned to study high-intensity disturbances, those which involve organized campaigns of violence and which are presently outside the scope of most Army civil disturbance doctrines. While the team at ADL looked at US events of the recent past, the team from GRC projected trends for the future, based in part on foreign experiences.

The special research teams were to recommend both civil disturbance data sources and ways to classify the data to a collection center at Battelle Memorial Institute (BMI). A staff at BMI, headed by Mr. Harold Hucek, had the assignment of assembling and organizing documented information according to suggestions from the special teams and LWL. The contents of the documents were to be processed to permit rapid retrieval and tabulation.

*Previous LWL efforts relating to civil disturbance control include those reported in the "Catalog of Selected Items to Aid in Controlling Civil Disturbances" (issued by OCRD in August 1968) and LWL Technical Report No. 69-14, Riot Control: Analysis and Catalog (October 1969). This latter report was based in part on supporting work by the following:

a. Cultural Information Analysis Center (CINFAC), Center for Research on Social Systems (CRESS), American University, reported in CINFAC/CRESS Sci Info Resp No. 2014, "Phases of Civil Disturbances: Characteristics and Problems."

b. Remote Area Conflict Information Center (RACIC), Battelle Memorial Institute, reported in Tech Rpt No. LWL-CR-02-RAB, "Report on the Status of Riot Control Hardware."

c. Booz-Allen Applied Research, Inc., reported in LWL contractor report (DRAFT), "Investigation of Promising New Concepts for Handling Civil Disturbances."

Using the assembled information plus their own knowledge and experience, the special research teams, assisted by LWL and BMI, were to develop hypotheses relating to the effects of military control measures on civil disturbances. The hypotheses were to be stated in such a way that they could be tested against the data at BMI. LWL would then determine the particular hardware and tactics which best provided the desired characteristics.

The work plan described above could not be completed because of data shortages and time restrictions. The main difficulty was that the quantity and quality of available published data on civil disturbances were inadequate for the original purposes of the program*. In particular, there are very few manuscripts giving detailed accounts of separate incidents in which military equipment and tactics have been employed. Furthermore, the terse narrative style of many documents made it difficult to draw detailed inferences for developing the data base.

Trying to work with the data led to a critical time shortage. More time was required for collecting documents and reducing them to information statements than was anticipated in the original work schedule. It was clear that reducing information statements to numerical data would cause additional delays. Consequently, the original work plan was altered so that the special research teams could rely on their own knowledge and experience to independently analyze civil disturbance control problems and recommend desirable control methods. The data collection center was to proceed on its own to finish gathering and organizing information and to begin putting information in numerical form for later use in verifying the findings of the special research teams.

During the remainder of the contract period, each of the special research teams independently gathered, reviewed, and analyzed information. This enabled each team to submit, in advance of contract deadlines, a report which was to identify major problems of civil disturbance troops and suggest tactical and hardware requirements for meeting these problems. The reports of the special teams have provided many of the ideas and conclusions of this final report.

The research team at ADL prepared a report based principally on interviews and discussions with small-unit leaders and state officials of the National Guard who have had direct experience with civil disturbances. The report

*To avoid a haphazard accumulation of data, and to maximize the chances of obtaining all the facts relevant to studied control efforts, the document search initially concentrated on twelve recent disturbances: Berkeley, CA (September 1964 - March 1965); Los Angeles, CA (August 1965); Cambridge, MD (July 1967); Detroit, MN (July 1967); Orangeburg, SC (February 1968); Wilmington, DE (April 1968 - January 1969); Columbia University, New York City, NY (April - July 1968); Washington, DC (April 1968); Baltimore, MD (April 1968); Cleveland, OH (July 1968); Chicago, IL (August 1968); and Madison, WI (Feburary 1969). However, even this narrow focus could not entirely overcome the obstacle of a dearth of published information.

contains both descriptions of control problems and recommendations for dealing with the problems through use of hardware and tactics. Going beyond specific control requirements, the ADL report analyzes some of the larger underlying issues which might affect solutions to specific individual problems. In support of the ADL conclusions, there are summarized records of the comments of National Guard personnel*.

The report from GRC also provides analyses of tactical problems and some of the larger underlying points for consideration. However, the report is oriented primarily toward identifying possible threats and problems of the future. As a result, discussions of specific problems are for the most part rather abstract and inconclusive, and recommendations often state needs for more planning and research without offering definite criteria for desirable hardware and tactics. The report also generally does not present the data or detailed arguments which were the basis for its conclusions. However, GRC reviews numerous hardware and tactical concepts in a way that helps to point out the multiple possible consequences of using each device**.

The data collection center at BMI compiled information and numerical data on control problems (fires, sniping reports, injuries to control forces, levels of violence, illumination) and control measures (deployment of National Guard forces, use of chemical agents, mass arrests, use of firepower, and curfews)***. In some cases, patterns in the data permit tentative conclusions. Generally, however, the responses from BMI were sharply restricted by the need to rely on published accounts of disturbances. Furthermore, there are many important questions about civil disturbance control which could not be answered because available reports lacked the necessary facts. Finally, the limited variety of facts plus the restricted time and manpower of the program prevented precise analysis.

Within the constraints of available documents and testimony on civil disturbances, the CLOARAD Program has attained several positive results. The evidence indicates that the problems and issues identified in the following pages will be continuing concerns of military planners and field commanders in future disturbances. The CLOARAD Program has also led to definitions of requirements for materiel and tactical solutions of these problems. Fulfillment of these requirements will demand detailed systems analyses of the potential solutions, including the careful gathering of relevant facts from archives and from systematic interviewing. Beyond these results, CLOARAD has suggested ideas for new hardware and tactics which might satisfy the criteria. The criteria and potential solutions are tentative because they lack rigorous definition and testing, but they should provide useful guidelines for any further efforts to evaluate civil disturbance preparations or to develop new and improved control methods.

*The methods of the ADL study are described in Appendix A to the report, Military Control Problems and Equipment/Tactical Performance Criteria for Low-Level Civil Disturbances, submitted by ADL to LWL.
**The final GRC report, CLOARAD - High Intensity Phenomena Program: Final Technical Report, is on file at LWL.
***BMI's Final Report for Project CLOARAD and details of some thirty BMI responses to LWL data queries exist at LWL.

The discussion of specific control problems and criteria for their solution makes up the second section of this report. An effort is made to present all the aspects of a problem, and to include in the criteria not only performance standards for hardware and tactics but also principles to guide the use of such measures. The report concludes with a summary of all its findings.

II. REQUIREMENTS FOR HARDWARE AND TACTICS

The CLOARAD Program identified eighteen problems that have an impact on military operations in civil disturbances. It is believed that these are the problems which deserve the most rapid improvement of hardware and tactics for responding to them. The problems are described in the following pages under three general headings: Control of Environment, Control of Citizens, and Control of Information. Each problem description is followed by a set of criteria for desirable solutions and suggestions of possible means for achieving solutions.

Both problems and criteria are stated here in general terms, pointing in the direction of desirable solutions without making explicit recommendations. This cautious approach keeps the findings of this report in line with the relatively unspecific contents of the data base. Further refinement of problem requirements must wait upon specialized and intensive research programs.

A. CONTROL OF ENVIRONMENT

1. Protection of Security Forces

Problem: Troops confronting rioters and demonstrators have often been targets for thrown objects and bodily assaults which can cause injury and the disruption of control operations. In the future, more intensive and organized civil violence could mean that troops would frequently be fired on. Inadequate protection of military forces against the threat of public attack could lead to less effective control efforts and a decline of morale and weapons discipline.

Criteria for Solution: Federal and National Guard units have already been issued or given access to quantities of protective equipment for civil disturbance duty. However, in preparation for future disturbances, important improvements could be made in keeping with criteria suggested here*. The primary requirement is still for protection against thrown objects, clubs,

*For example, large numbers of protective vests have already been issued to National Guard civil disturbance forces and additional large quantities of vests have been stockpiled for Federal and National Guard use when needed. However, this may not be a final solution to body protection requirements if future disturbances involve high-velocity hostile fire or the activation of greater numbers of troops in widespread locations.

and bodily assault, to reduce chances of injury to control forces or effective interference with them. A second requirement, however, is for protection against less likely but more dangerous attack by gunfire, flames, or explosion fragments. A third requirement is for sufficient numbers of devices to insure that all troops are well-protected at the start of their involvement in tactical operations.

Additional criteria for special protective needs are as follows:

a. Head Protection: Protective equipment should:

(1) Provide shielding of face and neck areas beyond that provided by conventional military helmets. National Guard leaders at various levels of command have indicated a desire for some means of protecting the face and neck. Such protection might have the desirable side-effect of reducing the need for evasive movement or defensive counterattacks in dealing with violent groups.

(2) Permit unobstructed vision.

(3) Resist damage from impacts.

(4) Be compatible with rapid emplacement of a gas mask, without increased hindrance to the user of the mask. Head protection should not be achieved at the expense of gas protection.

Potential Solutions:

(1) Shoulder-Supported Helmet: A shoulder-supported helmet, decoupled from the wearer's head, may be effectively used to counter high-energy ballistic threats which might be lethal to anyone wearing the normal-type military helmet.

(2) Crash Helmet: This is a plastic helmet similar to those employed in aviation. The advantages of plastic over metal include reduced weight and increased shock resistance. Helmet design could incorporate sliding goggles, radio transceiver and fittings for a quick-release gas mask.

(3) Commercial Safety Helmets: In attempts to control riots, there is a need for a safety helmet which will protect against bricks, bottles, and other thrown objects or against boards, pipes, and other objects wielded as clubs. These helmets are designed to protect the head against such objects. Protection is also afforded the ears and the upper part of the neck. Face shields are available to protect the face, and chin straps are used to hold the helmet firmly in place. Most models are available with other accessories such as rain capes, head-suspension units, flip-up eye shields, visors, helmet covers and carrying cases. These helmets are commercially produced by Defensor Protective Equipment, Inc.; American Optical Co.; Buco Products; Lake Erie Chemical Co.; Mine Safety Appliance Co.; Gentex Corp.; and others.

Some Army agencies have gone on record in opposition to the procurement of face shields, but discussions with National Guard leaders repeatedly produced comments on the desirability of face shields, and in several states the Guards have purchased them with State funds. The utility of such shields should be investigated, especially with regard to Criterion (4). The investigation should also consider the possibility of providing adequate facial shielding with either the M17A1, Protective Mask, or the M6A1, Hood, Field Protective. Criterion (3) may be particularly relevant because of the possibility that thrown objects could penetrate or cause injury through the M6A1 or could render the M17A1 inoperative.

b. Body Protection: Protective equipment, especially equipment designed to withstand high-velocity impacts, should:

(1) Leave one or both hands free as required to handle a weapon, gas mask, communication device, or vehicle.

(2) Weigh as little as possible. The fatigue caused by carrying heavy armor under conditions requiring frequent movement and long hours of duty would be a serious drawback.

(3) Minimize restrictions on mobility. For example, a shield should not get in a soldier's way if he needs it when entering a building. Armor should not impede arm and leg movement.

(4) Remain effective over extended periods of use and/or attack.

(5) Be either easily maintainable or cheaply replaceable.

Potential Solutions: It is possible that the present design and distribution of protective-armor vests are adequate to guard troops against the type and frequency of attack experienced to date. The major question for further research is whether modifications in existing equipment stockpiles can adequately cope with various threats of escalated future conflict, or whether escalated conflict is likely to require deployment of new equipment so that troops can achieve quick and efficient control. Research on this issue should take into account not only types of hostile weaponry and possible protective devices, but also the past and predicted risks of attack for civil disturbance troops. (For example, there should be an attempt to make estimates from past experience of the extent to which control troops would require maximum protection against high-velocity weapons.)

In the analysis of possible future requirements, it will be useful to consider items of equipment such as the following:

(1) Body Armor: The Carborundum Co. has produced a line of ceramic body armor which will protect men from projectiles in the velocity range of the .30-06, .356, etc. Their "KT" ceramic armor vest covers the front, back and groin and reportedly will protect the wearer against rifle ball ammunition at point-blank range. The basic components of these vests are inserts of a hard ceramic material backed by Doron, a fiberglass-type material.

(2) Steel-Plate Vest Body Armor: Davis Aircraft Products Co. manufactures a line of vests reportedly effective against non-ballistic fragments and the high-velocity semi-jacketed .357 magnum, .44 magnum and 9mm parabellum, as well as slugs and 00 and #4 buckshot from a 12-gauge shotgun. The vests are a Hadfield steel plate/nylon felt combination.

(3) Vest Body Armor: Lightweight bullet-resistant body armor will decrease the threat of injury from sniping during riot control operations. A vest developed by Federal Laboratories, Inc. is designed to reduce the threat of handgun bullets up through .357 magnum. The vest provides protection to torso and crotch from the front and rear. Constructed of overlapping armor plates sewn into nylon pockets, the vest is flexible and capable of withstanding handgun bullets of velocity up to 1430 ft/sec. Other lightweight vests are available to be worn underneath clothing and are capable of stopping cal. .38 special bullets.

(4) Fiberglass Plate Vest Body Armor: A 3-lb-11-oz vest, manufactured by Defensor Protective Equipment, Inc., is made of overlapping Doron "fiberglass" armor plates covered with a nylon material with reinforced webbing. This vest is designed to protect vital frontal body areas from thrown objects as well as bullets of velocity up to 855 ft/sec. Other available models will provide protection against handgun bullets up to and including 9mm parabellum, and the standard .357 magnum loaded with a 158-grain lead bullet.

(5) All-Nylon Vest Body Armor: A ballistic nylon vest, conceived by Dr. R. F. Rolsten, affords protection against non-ballistic threats and handguns up to and including .357 magnum. It is an all-nylon vest with no metallic protection.

(6) Body Armor: A ceramoplastic ballistic vest, manufactured by Reflective Laminates Division, Fansteel, Inc., offers protection against non-ballistic threats and ballistic threats up to and including cal. .30 M2 AP projectiles at muzzle velocity and zero degree obliquity. It is a nylon cloth carrier with rigid ceramic fiberglass inserts.

(7) Steel Leg Armor: Leg armor for helicopter pilots, developed by Aeronutronics Division, Philco-Ford, offers protection against cal. .30 M2 AP projectiles at muzzle velocity and zero degree obliquity. It is formed from composite DPSA steel armor for complete protection.

(8) Fiberglass Resin Shield: The E. Morton Pitt Co. produces a portable, bullet-resistant shield which may be used to protect against handguns with a muzzle velocity up to 1430 ft/sec. It has a transparent Plexiglass bullet-resistant window. By kneel-

ing behind this shield, it is possible for a police officer to fire a revolver with added safety. A similar shield without the Plexiglass window is available from Federal Laboratories, Inc.

(9) Polycarbonate Shield: Federal Laboratories, Inc. makes a transparent shield of double-thick polycarbonate that has an impact strength many times that of safety glass, and affords protection against non-ballistic projectiles. Convex in shape with rounded corners, this shield is large enough to protect most of the body's vital parts. Worn on the arm, it has an aluminum handle and an adjustable forearm strap that will break if someone twists the shield.

(10) Body Pads, Lightweight (LWL Concept): Body protection in the form of lightweight body pads may be worn under regular clothing to give some degree of protection to legs, arms, and chest. Riot control personnel thus-equipped will not become special targets of the mob.

(11) Supplementary Modular Body Armor Concept: Lightweight, modular body armor which can be removed from and added to basic armor to meet varying threats might be desirable.

(12) Plastic Body Armor (LWL Concept): This concept involves the use of Lexan plastic body armor, a high-impact, light, transparent, 1/4" plastic, capable of stopping a cal. .22 round. It will provide protective cover for the face and other parts of the body.

c. Vehicle Protection: Protective equipment should:

(1) Be adaptable to a variety of vehicles for defense against a wide range of attacks. Such flexibility of use is desirable because vehicles in civil disturbances need to be multi-purpose and because there is a possibility of rapid changes in the level of hazard.

(2) Prevent penetration of the vehicle by objects or by flames. For all vehicles there is a risk of smashed windows or of fire from incendiary devices. Vehicles used in responding to reported shooting may need bulletproofing.

(3) Prevent immobilization of the vehicle by small weapons. Immobilized vehicles are vulnerable to direct and mass attack, as demonstrated from Berkeley (1964) to Chicago (1968). Protection should extend to the engine, wheels, and underside of the vehicle.

(4) Avoid reducing the maneuverability of the vehicle.

(5) Permit rapid and easy loading and unloading.

(6) Be sufficiently tamperproof to permit relatively safe parking of vehicles in a disturbed area. Tamperproofing is desirable to allow troops to con-

duct operations on foot, with vehicles available in a fixed position nearby. Vehicle security should require supplementing only with guards or modifications for hardening.

(7) Allow easy reinforcement or hardening of defenses on those vehicles capable of supporting the additional weight of armor. This would reduce the need for the continued presence of armored vehicles, which could contribute to local tension and dissident publicity.

(8) Permit easy assembly and removal of protective equipment. This would enable many general-purpose vehicles to be quickly prepared for riot duty and later quickly restored to their original condition.

Potential Solutions: USCONARC has submitted an ENSURE request to evaluate a Protective Hardening Kit, 2-1/2 Ton Truck. The characteristics called for in the request should satisfy many of the above criteria. It will be necessary in evaluating the kit to consider the possibility for further hardening to withstand high-velocity fire. Also, if the evaluation is favorable, there should be an effort to adapt the kit for use on other vehicles, in keeping with Criterion (1).

In recent disturbances, there has been rather widespread use of field-expedient wire screens for vehicle protection (particularly 1/4-ton), and DOD's "civil disturbance" agency, the Directorate of Military Support (DOMS), has distributed a standard plan for such screens. While screening cannot provide as complete protection as a hardening kit, it may possibly have some immediate advantages in terms of Criteria (1) and (8), as well as availability. However, it would be useful to obtain further information on the portions of a vehicle requiring screening (e.g., how serious is the risk of attack from the sides or rear?) and on the best balance between maneuverability and protection of the undercarriage (as with a "cowcatcher").

Additional devices and concepts which might help to meet the criteria are as follows:

(1) Modular Steel Vehicle Armor: The Great Lakes Steel Corp. has manufactured a modular armor for patrol vehicles affording protection against non-ballistic threats, and ballistic threats up to and including cal. .30 M2 AP projectiles.

(2) Modular Vehicle Armor: The Aeronutronics Division, Philco-Ford, has also manufactured a modular armor for use on patrol vehicles against non-ballistic and ballistic threats up to and including cal. .30 M2 AP projectiles.

(3) Safety Glass: Safety glass offering protection of vehicles against fragments and low-energy handgun projectiles is produced in a number of sizes and thicknesses by PPG Industries, Inc.

(4) Plexiglass Vehicle Shield: Acrylic Plastic (Plexiglass) shields are manufactured by Rohm and Haas Co. These shields have been

adapted for security forces, to police cars, to fire vehicles, and to store windows.

(5) Plastic Vehicle Shield (LWL Concept): This concept is for a preformed shield of ABS (Royalex) plastic to provide protection against thrown missiles. The shield could be quickly installed.

(6) Riot Control Wagon: The Lyncoach and Truck Co. manufactures an all-aluminum van body which will fit on any parcel delivery truck chassis. The body is not armor-plated but incorporates safety glass windows backed with expanded metal screens. It contains two separate compartments, one for prisoners and one for security personnel. Two gun ports face forward and two to each side.

(7) Peacekeeper: This is an armored vehicle about the size of a station wagon, which was designed by Aerojet-General Corp. It incorporates lightweight armor and bulletproof glass and has two sets of dual front tires with an armored disc between. A turret atop the car contains rifle and gas guns, radar, bullhorn, searchlight and LLL TV camera. Pneumatically-operated braces can be extended from the sides of the vehicle to prevent rioters from overturning it. Special insulation is built-in to protect the vehicle from Molotov cocktails.

(8) Rioto: This armored vehicle, manufactured by Bauer Ordnance Co., uses a Chevrolet truck chassis. It weighs approximately 4,000 lbs. and utilizes a 220-hp V-8 engine, 4-speed transmission and power steering. A 360° turret can mount various weapons. The body is protected by high-voltage electricity. A water tank holds 250 gallons and provides for injection of chemical agents. A special flamethrower ejects balls of atomized gasoline that quickly envelop a target and just as quickly pass on doing little more harm than singeing eyebrows. A rear compartment will accommodate 10 officers or prisoners, or 2 stretcher cases with attendants.

(9) R-2 Multipurpose Police Vehicle: A rubber-tracked, armored vehicle which can attain speeds up to 35 MPH is manufactured by B&H Enterprises. It is fully armored, with bulletproof glass, gun turrets and gas ports. Two chemical nozzles mounted forward on the cab can dispense tear gas or firefighting agents. Three 8-ft bench seats accommodate a 15-man crew. The cabin is insulated and air-conditioned and a chemical toilet is included. Four high-power quartz lamps, a PA system, radio and firefighting equipment are operated from a central control panel in the cab. The R-2 weighs 10 tons and includes a 30,000-lb winch, bullet-resistant track skirt, and two 500-lb tanks of dry chemical fire extinguisher. The unit can operate in 3 feet of water and cross a 5-ft ditch.

(10) Police Patrol Vehicle: The Chrysler Corp. has manufactured an armored 4-man vehicle which can attain speeds of 65 MPH. It has 4 firing ports and a rotating turret.

(11) Emergency Vehicular Traction Concept: This item consists of solid rubber interior treads which bear on the ground surface if tires are slashed.

(12) Emergency Heatproof Vehicular Traction Concept: This concept involves radial tire construction with a latex-filled interior. Heat dissipation occurs by means of multiple fine wires dispersed in the latex and terminating in cooling fins or a metal rim. An alternate cooling concept might include air channels.

(13) Flatproof Tire: The Dow-Corning Corp. has the basic patent on foamed inflation of tires.

(14) Internal Jacks Concept: Built-in jacks to raise a vehicle completely off its wheels would make rocking and turnover more difficult.

(15) Vehicular Electrical Shield Concept: This idea envisions a high-voltage, low-current electrical source to shock anyone touching a vehicle from outside, with complete safety inside. It should be non-lethal and controlled from inside the vehicle.

(16) Debris-Clearing Device Concept: A commercial road-sweeping brush could be fitted to a military vehicle to clear a path of glass and debris and thus improve ground mobility.

2. Deployment of Forces

Problem: In recent civil disturbances, control forces have frequently encountered hit-and-run violence and regrouping of dispersed crowds*. An efficient response to these activities will require troop movements with speed, coordination, flexibility, and variation in scale that have not always been possible in the past. Troop mobility depends on successfully providing, positioning, and routing transportation. For example, troops may suffer delays in deployment if transport vehicles must be dispatched to them from some distance away. Air-lifted troops may be dependent on having ground transportation with them or awaiting them on arrival. Blocked roads, traffic disruption, and overconcentrations of official vehicles are all real threats to mobility.

Criteria for Solution: A successful response to mobility requirements depends on planning which specifies not only the types of troop units and transportation equipment to be used, but also the positioning of equipment and the strategy for moving it. The general features of this planning should:

*Cf. reports on rioting in Baltimore (1968), Miami (1968), and Madison, Wisconsin (1969).

a. Treat each troop unit assigned a quick-response mission and its required transportation as an integrated system. This will avoid the risk of separate, poorly-coordinated plans for control units and transportation units*.

b. Provide guidelines for the size of troop units to be deployed for various tasks. For operations such as sniper control, crowd control, or curfew patrolling, there should be decisions well in advance about whether to deploy initial troops and reinforcements as companies, platoons, squads, or other-sized units. Such decisions will make clear the consequent demands for mobility.

c. Take into account the possible use of helicopters, for example, in situations where immediate rooftop control is desired, where streets are badly obstructed, or where there is danger of ambush in the streets. While there have been preparations for helicopter transport in previous disturbances, this method has not yet been extensively put to use, and questions of routing and public safety in urban areas would have to be worked out.

d. Utilize local resources where available. Such resources might include fuel, vehicles, and knowledgeable drivers. Local transportation was successfully used in Detroit (1967) and Washington (1968), but arrangements for local assistance are not part of general civil disturbance planning for Federal forces. The importance of supplementing military transportation could become crucial in a large-scale disturbance with numerous, widely-scattered incidents, since present equipment authorizations for Federal civil disturbance brigades apparently allow considerably less than full mobility.

e. Take into account limitations of mobility, especially for ground transportation equipment.

f. Provide instructions for dealing with traffic obstructions created by rioting. Such instructions would define the occasions for using tracked vehicles and procedures for improving wheeled-vehicle stability and traction or for changing the mode of deployment.

g. Provide for two-way communication with each vehicle or aircraft used for troop transport. All military vehicles and aircraft currently utilized in civil disturbance operations have the space and electrical power for two-way radio communication systems. Furthermore, authorized radio equipment for Federal civil disturbance brigades is sufficient to allow for an installed or passenger-carried radio for all vehicles. If authorized equipment is provided, and if a similar supply of equipment is available to National Guard units, then this criterion will simplify to a need for radio compatability and a need to insure that distribution of radios to dismounted troops does not leave some troop carriers without two-way communications.

Potential Solutions: Most of the criteria refer to planning requirements apart from the specific equipment items of control methods used, but there are places for some important technical contributions. For instance, the following concept would apply to Criterion d:

*This principle demonstrated its value in the control of protesters at Fort Dix, New Jersey (1969).

a. Handbook on Local Resources: This handbook would describe techniques for adapting locally-available equipment to riot control needs. Such a handbook could potentially supplement civil disturbance planning packets by providing information on a wider range of resources for a larger geographical area than a particular packet would necessarily contain.

Fulfilling Criterion f will depend upon the equipment available for dealing with traffic obstructions. The use of armored personnel carriers is a presently-available response to some situations. Other possible aids would be:

b. Emergency Vehicular Traction Concept: (See above, item (11), page 12).

c. Emergency Heatproof Vehicle Traction Concept: (See above, item (12), page 12).

d. Flatproof Tire: (See above, item (13), page 12).

e. Debris-Clearing Device Concept: (See above, item (16), page 12).

The use of special equipment for improved ground mobility (Criterion d) or for air transport (Criterion c) raises the general question of how such equipment could best be positioned and employed. This depends partly on local conditions, but also on resolving specific questions such as (1) what obstruction of urban roadways would require use of tracked vehicles, and what kinds of obstruction could be removed by street-clearing operations with light vehicles?; (2) what is the feasibility and rate of transport for air-lifting troops into heavily built-up areas for different types and distributions of landing/unloading sites?; and (3) what is the relation between required quantities of specially-equipped vehicles (special tires, sweepers, tracked vehicles) and the frequency and type of roadway obstruction, taking into account the immediate availability of alternate routes?

A complex analysis would be required to resolve another simply-worded question: what sizes of military units should be ready for deployment in response to different control problems (e.g., reported sniping, crowds, scattered looting)? Actually, there are several issues involved. It may be desirable to deploy units of one size (squads) to combine into another-sized unit (platoon) at the scene of action. The initial operational unit may be of a different size (platoon) than a unit ready for reinforcement (company); and the probable pattern of small- and large-scale problems may call for a certain mixed breakdown of units to maximize needed operational flexibility. For a particular answer to each of these issues, it might be possible to determine the best feasible distribution of units and transportation equipment in the zone of military operations.

3. Illumination

Problem: Darkness has given rioters the advantages of limited detectability and anonymity. It is not surprising, therefore, that riot activity has con-

sistently reached a high level at night. Rioters may even try to improve their situation by putting out streetlights*. Darkness also interferes with the efforts of control forces to remove bystanders and injured persons and to locate and verify gunfire. However, bright lights are not a simple solution to the problem, since some forms of illumination can interfere with the vision of the control forces while making them conspicuous targets**.

Criteria for Solution: The keys to the problem are control of illumination and reduction of the disadvantages imposed by darkness. The use of existing and future equipment should enable:

a. Immediate and variable control of outdoor lighting. Such control would permit control forces to gain the maximum benefits from either light or darkness. Good illumination can be used with precision to enable troops to see and be seen by rioters, bystanders, and victims. Temporary darkness may serve to conceal troop movement, to reduce the vulnerability of control forces, or to channel the flight of rioters.

b. Directional illumination of locations, activities, or individuals from a distance. Use of searchlights or floodlights at a distance may provide troops with a desirable advantage in the face of sniping threats or low troop-to-crowd ratios. Spotlighting may help to make disorderly individuals feel more vulnerable physically and psychologically, making them more compliant with control procedures and discouraging further disorderly behavior by anyone risking detection and identification.

c. Wide-area illumination. Control forces may need to illuminate large areas (city blocks, campuses) for extended time periods from few locations (because of limited opportunities to emplace lights or limited ability to protect them). Such area illumination can reduce the opportunities of hostile individuals for surprise or evasion, and can also reduce the risk of accidental or hasty actions by control forces.

d. Unimpeded observation and movement in areas of low illumination. Troops may need to move through or take control of unlit areas, either because of disadvantages from exposure or because area illumination is temporarily unavailable. Military units must thus plan the most effective use of both vision aids and non-visible light sources.

e. Maximum reliance on control of public lighting facilities. Limited supplies of military lighting equipment and vision aids can then be channeled to only those areas where public lighting is inoperative or creates operational difficulties.

*Mentioned in reports on Orangeburg, SC (February 1968), and Chicago (August 1968).
**Cf. complaints about street lamps in Detroit (1967) and about camera lights in Chicago (August 1968).

f. Highly mobile and portable illumination. In rapidly-developing incidents of disorder, control forces may need to augment public lighting quickly to help coordinate operations, clarify the situations, inhibit disorderly activity, and enable recording of events.

g. Protection of lighting equipment against attack and sabotage.

h. Self-protected illumination of specified areas for extended time periods. These areas will thereby be open to continued observation and patrolling with reduced risks to control forces.

Potential Solutions: There are several devices which could possibly satisfy Criteria b and f. These devices can be roughly divided into two groups: vehicle-mounted lights and man-portable lights.

The standard vehicle-mounted illumination device for civil disturbance forces is the 2.2-KW, 23-inch xenon searchlight, AN/MSS-3, mounted on a 1/4-ton truck. It is reported that many of these lights have been supplied to National Guard units, with a number of others prepositioned for loan; the searchlights are also authorized equipment for Federal civil disturbance troops. The AN/MSS-3 will eventually be replaced by a lighter 1.6-KW model. Because of the advantages of lightweight and remote-control features, it is also worthwhile to consider the vehicle-mounted adaptation of the Spectrolab Nightsun SX-16 searchlight for comparison with standard equipment.

a. Nightsun SX-16 Searchlight: This is a powerful, lightweight searchlight, developed for helicopter use but adaptable to ground vehicles. It develops approximately 3.8 million candlepower and projects a 300-ft-diameter spot from altitudes of 2,000 ft. Input power for this searchlight is 28V DC at 60 amps.

While the vehicle-mounted devices may satisfy Criteria b and f in many respects, they leave some questions unanswered. Besides the problem of immediate availability, which may depend merely on the number of lights and vehicles supplied to a control force, there is also the matter of variable control of illumination (Criterion a). The ability of the lights to use less than full-power illumination are important considerations. Lighting should not always have to be so bright that troops are completely night-blinded, although protective goggles may be an answer to this problem.

Questions about supply and variable use also apply to man-portable lights, but these devices may fulfill Criteria b and f in some respects even better than vehicle-mounted equipment. While the USCONARC Civil Disturbance Plan allows use of unspecified spotlights, some particular devices which may be useful are as follows:

b. Mini-Nova MK II: This hand-held xenon floodlight is manufactured by Pichel Industries, Inc. for area illumination, spotlighting, and temporary visual impairment. It has an effective range of 300-400 meters and produces a floodlit area with an intensely-lit

(one-million-candlepower beam) central zone. It can be powered by a 115V AC system or by portable or vehicular batteries. A snap-on filter for use in an infrared mode is also included.

c. Minilight: This searchlight is a portable or airborne target illumination device manufactured by Electro-Optical Systems.

d. Riot Light: This is an all-purpose riot light manufactured by the Carpenter Manufacturing Co. The light projects a 50,000 CP light beam for about 1/2 mile. It will operate from a vehicle electrical system or from a portable battery pack.

The desirability of having both the light and its power source portable is obvious. The possible advantages of using narrow lightbeams should also be taken into consideration.

The equipment described thus far is designed to illuminate fairly restricted zones for limited time periods. Lighting up large areas (sections of a city, campuses) for hours at a time (Criterion c) may require different methods. One possibility is the use of airborne illumination such as the following:

e. 30-KW Airborne Searchlight: This system is under development by the US Army for use in Southeast Asia and is mountable in UH-1C, UH-1B, or CH47 helicopters. A xenon or plasma arc light source provides a 35° beam, illuminating an area of 600-yard radius 8 times brighter than moonlight when the aircraft is flying at 6,000 feet.

f. Spectrolab Nightsun SX-16 Searchlight: (See a above).

Another possible approach to area illumination is the use of reflected light:

g. Area Illumination Concept: This is a concept for the use of aerosol clouds over a large area. When the cloud is illuminated by ground searchlights, it would, by diffusion, provide illumination over large portions of a city.

Although bright-light devices are numerous, there is still a necessity to make darkness work to the advantage of control forces rather than for rioters (Criterion d). To this end, there are various night-vision sights which could be utilized by National Guard or Federal civil disturbance forces. In addition, control forces might employ infrared illumination:

h. IR Illuminators: Infrared searchlights, ranging from standard incandescent light bulbs to multimillion-candlepower xenon arc lamps employing infrared filters, are available for both ground and airborne use. Most such devices perform most efficiently in the near-IR region.

There are many existing and proposed pieces of equipment which could fulfill individual criteria listed above, and there are even a few multipurpose items (e.g., bright-light sources that can be fitted with infrared lenses). Choosing among possible solutions requires information which should include: (1) estimated areas to be illuminated, (2) necessary duration of illumination, (3) estimated number of illumination periods per night, (4) effects of angle of illumination (street level, overhead, aerial), and (5) expected output of public lighting systems. With information such as this, it should be possible to recommend the distribution and use of several kinds of equipment.

4. Firefighting

Problem: Widespread fires, often set by bombs or other incendiary devices, have been a common feature of recent major civil disturbances. It is essential to respond to the fires as swiftly as possible. However, civilian firefighters trying to perform their duties have many times come under attack, which reduced their effectiveness*. Furthermore, even if firemen are protected by security forces, there is a real danger that the combined civilian firefighting resources of large cities and their surrounding communities may be insufficient to cope with the severe fire problems**.

Criteria for Solution: The need for quick action and the scarcity of local manpower for fire control create a demand for military firefighting assistance as part of civil disturbance control efforts. Military participation should involve:

a. Organization of combined teams of firemen and soldiers, in which the primary military mission of protecting the firemen would be supplemented by a secondary mission to aid in firefighting. Establishing combined teams and the secondary mission on a regular basis, while consistent with general statements in US Army Field Manual 19-15 (FM 19-15), Civil Disturbances and Disasters, could also help to discourage attacks in advance and would allow the most efficient use of manpower at the scene of a fire.

b. Increased development and use of military firefighting capabilities. This criterion is based on the need to insure rapid response to fires. At a time of severe civil disorder there are often not enough firemen to deal with all the fires requiring prompt attention. Furthermore, many fires, such as those started with Molotov cocktails, can be detected and dealt with before they grow very large***.

*A partial sample of disturbances during 1967-1969 revealed twenty cases in which citizens attacked or interfered with firemen at work.
**Los Angeles (1965), Detroit (1967), and Washington (1968) showed the limitations of local fire departments trying to respond to multiple fires in large urban areas with zones of high building-density.
***Concerning the possibilities for immediately extinguishing Molotov cocktail fires, see the report, "A Compact Fire Extinguisher," prepared for LWL by Franklin Institute Research Laboratories under Contract DAAD05-69-C-0283.

c. Elementary training in the problems and techniques of dealing with fires. Troops in a civil disturbance are likely to encounter both fires and control problems exacerbated by fire (e.g., evacuation, assistance to firemen, crowd control, restricted mobility). Incorporating basic knowledge of how to respond to fires into civil disturbance training can help insure against delayed or inappropriate reactions during a disorder.

d. No conflict with primary military missions. Doctrine and plans should clearly define when troops will participate in firefighting, what actions or duties they can perform, and what authority is required to initiate these.

Potential Solutions: In communities with military installations nearby, one response to Criterion b may be the emergency employment of installation firemen and equipment in support of local fire departments. The occasions and extent of this assistance must be determined by local planning and by the requirements for the security of the installations. However, this specialized military assistance, combined with local firefighting, still may not answer the immediate needs of troop units encountering fires during operations.

For small-scale fires, the LWL Catalog* offers the following concept:

> Compact Fire Extinguisher: This is an idea for a small hand-thrown fire extinguisher for retarding or extinguishing a fire in its initial stages prior to the arrival of professional firefighters and equipment. The device is to be effective over an area equivalent to that produced by a Molotov cocktail. It could be approximately the size and weight of grenades, in general, and would be constructed in such a way that it could be carried without interference to an individual's performance of his primary duties and with due attention to safety factors.

There is also the possibility of adapting larger, high-pressure spray devices for military vehicles, but this concept requires further exploration.

Before criteria can be applied to the development of tactics and hardware, there needs to be a thorough analysis of at least two general questions. First, what range of military assistance is a local fire department likely to require? Among the points to consider are (1) the men and equipment needed to deal with attacks, ranging from thrown objects to sniping; (2) the deployment of troops and equipment to handle both threatened attacks on firemen and the demand for firefighting reinforcements; and (3) the situations, if such exist, where troops would shift from a defensive to a firefighting role even though attacks were continuing. The second question is, what capability do ordinary civil disturbance troops need for coping with fires? Part of the answer will come from information about troop encounters with fires and fire-related problems. The rest of the answer will result from analyzing what minimum changes in troop preparations for fires are required to produce a valuable increase in operational effectiveness.

*LWL Technical Report No. 69-14, Riot Control: Analysis and Catalog, October 1969.

5. Building Control

Problem: A building can be a haven for hostile rioters to escape into or attack from. It can serve as a storage place or source for riot weaponry. It may also house people and property that have nothing to do with the disorder outside. Military units require the ability to control buildings with a minimum of risk to themselves and a minimum of damage to property or injury to occupants.

Criteria for Solution: An improved approach to building control requires a thorough restatement and application of present doctrine. This approach will depend in part on:

a. Providing troop units with the means to gain protected access to rooftops and upper floors. Protected scaling techniques may avoid the need for immediate use of riot control agents or weapons fire to protect the maneuver elements against attack.

b. Developing detailed guidelines for deciding when to clear buildings and when to occupy them.

c. Realistic training in tactics of building entry and indoor operations, including techniques for minimizing violence to persons and property.

d. Insuring the presence of civil officials who can take care of any need to detain occupants or seize property. To expand on the principle expressed in FM 19-15 and the USCONARC Civil Disturbance Plan, any practice should be encouraged which helps limit military assistance to actions for which troops are uniquely qualified and required.

e. Emphasizing the requirement that security forces prevent damage or misuse of buildings after occupation. If there is abuse of seized property, by anyone for any reason, bad publicity may result as it did after Plainfield, NJ (1967), Detroit (1967), and Greensboro, NC (1969), and the police occupation of Columbia University (1968).

Potential Solutions: Meeting the criteria for better building control will result mainly from increased emphasis on better planning and training. There are some hardware concepts, however, which may be of help, such as the following:

a. Rappelling Kit: A rappelling system will permit troops to be quickly deployed to rooftops from hovering helicopters. Systems are available (one developed by LWL for troop deployment into jungles) which are safe and require a minimum of training. The LWL system consists of a lowering device with rope, a simple body harness, and a webbing anchor attachment to the helicopter. The helicopter webbing anchor attachment can be adapted for the type of helicopter used.

b. Scaling Cable: This cable is an LWL concept incorporating press fittings at ladder-rung distances that can be used with hand- and

foot-fittings for climbing from an unanticipated direction. A special grapnel with a short length of chain would provide anchoring on cornices.

But the greatest contribution would come from clarifying some of the general ideas contained in documents such as FM 19-15. There may be multiple routes to the top of a building, but there appears to be a lack of systematic review of all possible methods (including inside access) resulting in advice on the best techniques for different buildings and different situations, judged in terms of speed, surprise, and safety of troops and occupants. Similarly, there is an apparent shortage of information comparing the results of isolating, "waiting-out" tactics against the method of direct entry; from such information, guidelines could be developed for the timing of each tactic. Well-analyzed guidelines on the varied methods and timing of building control could be incorporated as part of civil disturbance training.

6. Barriers

Problem: Control of civil disturbances depends to a great extent on control of the movement of the public. It is necessary to try to prevent people from entering property to destroy or loot it. It may be necessary to restrict movement of people in places where their presence could add to control problems. It may be desirable to channel public movement along the least dangerous routes. Finally, it may even be advisable to close off areas to prevent the spread of disorderly activity.

Control of movement depends fundamentally on voluntary compliance with regulations and person-to-person relations between control forces and the public. However, in every civil disturbance to date there has been a need to reinforce control with physical, impersonal, self-maintaining barriers. The absence or misuse of barriers in the past may have contributed to problems ranging from looting* to violent confrontations** and the shooting of individuals in restricted areas***.

Criteria for Solution: The proper use of barriers should follow two general principles. First, barriers are a reinforcement and not a replacement for

*Cf. the initial inability of police to halt looting on Detroit's 12th Street (1967) and Newark's Springfield Avenue (1967), as documented by the National Advisory Commission on Civil Disorders.
**Cf. the control of public opportunities to remain in Grant Park, Chicago, or to leave the park, on the evening of 28 August 1968, which resulted in a crowd moving down Michigan Avenue into a direct face-to-face collision with outnumbered police. The details of crowd movement are provided in the report, Rights in Conflict, submitted to the National Commission on the Causes and Prevention of Violence.
***Roadblocks in particular have produced shooting incidents. Los Angeles (1965) experienced several such incidents (see Robert Conot, Rivers of Blood, Years of Darkness, pp 271-279, 325-330). A Guardsman died in a roadblock incident in Detroit (1967).

human control; while they may reduce the number of troops needed at some locations, their use must still be tempered at the scene by human judgment. Second, barriers should be able to exert a precise control which does not impair legitimate movement by citizens. In addition, the use of barriers should:

a. Minimize injury to or antagonization of citizens. The chances of antagonism increase with barriers that are discomforting on accidental contact and with expressions of hostility and insults from control forces manning the barriers. Punitive barriers tend to encourage disorderly behavior by hostile individuals and discourage cooperation from citizens in general.

b. Resist penetration, traversing, or removal by violaters. Rioters may try to bodily cross barriers, to drive vehicles through them, to break or disassemble them, and particularly to throw objects or fire weapons across them. There is less likelihood that troops will have to employ force to defend barriers if the barriers themselves are difficult for rioters to overcome.

c. Not inhibit the movement or operations of control forces. This may require control forces to maintain a monopoly of the means to neutralize the barriers and/or guards to protect all paths through the barriers. Crowds should not be able to use control force barriers against the control forces.

d. Allow the option of opening pathways through barriers. Curfew enforcement and protection of public buildings should allow the passage of people on legitimate business, and control forces at any barrier should be prepared to admit emergency personnel. An inflexible barrier reduces a field commander's options and is likely to impair control force efficiency and public relations.

e. Require only small troop units for immediate support and control. Small guard detachments will leave more troops free for rapid and flexible deployment in any focal area of disorder.

f. Require minimal maintenance and inspection.

g. Allow swift and relatively easy construction and removal. If barriers are needed to ward off a moving crowd, they must go up in a hurry. If barriers persist or reappear after their period of usefulness, they may be a military hazard and a public irritation.

h. Be clearly and securely bounded. This is both a mechanical and tactical requirement. Barriers should not spread into more areas than is necessary (as CS did when used to protect stores in Baltimore, 1968) and should not invite accidental contact (for example, children wandering into a gassed zone, or cars driving into obstacles on a dark street). Troops should confine their barrier enforcement to areas, individuals, and actions which the barrier was explicitly set up to halt.

i. Minimize damage to property.

Potential Solutions: There are a multitude of mechanical and chemical devices available which can be used to create barriers. Comparing these devices may

be fairly easy in terms of some criteria (effects of accidental contact, speed of assembly/disassembly, interference with control operations, etc.). However, efforts to select the best barriers and the best ways to use them will have to face recurrent questions requiring detailed research. It may help to state a few of these questions in advance, as examples:

- How much is it necessary to go beyond discouraging movement across a barrier to physically prevent such movement? (The tougher the barrier, the more likely it is to create difficulties for control forces as well.)

- How wide do barriers have to be in most of their uses, and how deep do they have to be? Will there be frequent need to prevent access, or movement, or both?

- When will barriers need to operate against individual or small groups, and when will they need to be effective against masses of people?

- How long can a given type of barrier withstand a well-equipped or concerted attack by rioters? And how soon can rioters establish routes around the barrier?

Keeping these questions in mind, there are a number of different types of possible barriers worth considering. One commonly accepted kind of barrier uses wire or tape. In addition to the use of multiple concertinas of barbed wire, described in FM 19-15, there are several other possibly useful concepts:

a. Barbed Wire: One general-purpose barbed obstacle consists of a helical-spring steel tape compressed to a closed coil and packaged within a polyurethane foam container. There is sufficient tape to form a 76-ft barbed entanglement 30 inches high. Another rapidly-emplaced antipersonnel obstacle consists of a barbed tape wound in a reel approximately 6 inches in diameter. It comes in a clam-shell type shipping container containing 12 reels. The energy for tape erection comes from the recoil action of a gun, accommodating a standard 7.62mm NATO cartridge which may be employed to anchor the tape in the ground.

b. Wire Coils: For hasty barricades to control foot and vehicular traffic, coils of wire could be carried in a trailer and dispensed from a container by spring action similar to that of a "Slinky-Toy."

c. Wire Gun: This "gun," developed at Frankford Arsenal, will rapidly emplace a barrier to obstruct a street or alley. The wire gun is a cylinder containing a coil of barbed wire. The wire is coiled in the container under tension. When the coil is released, the tension supplies the energy to propel the wire from the tube to a distance of 80 feet.

Among the points to be weighed in evaluating wire barriers are the ability of hostile fire to be directed through or over them and the ability of rioters to neutralize the barriers (Criterion b).

Another type of barrier operates by rendering footing and/or visibility difficult, by use of sprays or foams.

d. Anti-Friction Oil Spray: Natural lubricating oils can be sprayed on the rioters and on street surfaces so that street surfaces become slippery and rioters cannot remain standing.

e. Low-Friction Polymers: Various low-friction polymers (Teflon) and slippery liquids (Slippo) are commercially available. As the coefficient of friction is reduced below 0.5, walking becomes progressively more difficult and a slippery-floor effect can be created on pavements and sidewalks.

f. Instant Mud: A concrete mixer could be used in conjunction with a pressurized dispenser.

g. Instant Banana Peel: A non-toxic white powder, manufactured by Western Co. and known as Rio-Trol, is dusted onto a surface, then washed down. The powder then turns into a thick paste, fills in the rough spots in a sidewalk or street, and forms a slick film. The result is a patch of pavement that is almost too slippery to stand immobile on and almost impossible to move across.

h. Foam Projector: The ingredients are mixed and maintained at high pressure by a pump and accumulator. The product is expelled through a nylon mesh screen to produce foam. At maximum pumping rates, units are advertised to produce 5000 cu ft of foam per minute.

i. Bubble Generator: This device, developed by National Foam Systems, Inc., is a high-volume disseminator of heavier-than-air bubbles that serve to obstruct crowd movement by obscuring the street, limiting visibility, and producing a slippery surface.

j. Foam Generators: These machines, portable or mounted on a truck, blow air through a nylon net kept wet with a mixture of foam concentrate and water to quickly produce a large volume of foam which will last from 5 to 10 minutes. CN, marking dyes, smoke-producing materials, water-gelling agents, and antifriction substances could be added to the formulation. Such generators are manufactued by Walter Kidde & Co. and National Foam Systems, Inc.

The chief problems of using these barriers are their persistence (Criterion g), their risk of causing accidental injury (Criterion a), and their possible interference with control forces (Criterion c) and legitimate traffic (Criterion d). These problems might necessitate special techniques for passing through and/or removing the barriers.

A third type of barrier is designed to create an impenetrable wall between rioters and their target. For barricading streets, the following concepts are relevant:

k. Foam Barricade: Foam barriers would be placed by hose. They would consist of quick-setting foam so that a barrier of several feet in height and perhaps the same thickness could be built up quickly.

l. Mass Protective Shield: A method is required to contain crowds and to prevent crowds from pushing against or breaking through police lines. The proposed device (an LWL concept) will have an interlocking feature so that adjoining shields can be locked together to form a continuous wall.

m. Instant Jungle: This device would consist of a large projectile filled with a quick-setting gel and a small amount of explosive. Upon detonation, it should form an effective barricade.

For blocking off smaller areas, such as storefronts, concepts such as the following may apply:

n. Rapid Rope: Rapidly-erected barriers are needed to prevent entry and vandalism of public buildings and utilities and to prevent looting of stores. A nylon barrier could be used as an ensnarement device. The nylon roping would be dispensed by means of an "Archolithic Gun," using a portable air compressor mounted on a 1/2- or 3/4-ton vehicle. The air compressor should have a minimum capacity of 30 cubic feet per minute at 100 psig pressure.

o. Electrified Barrier: A method is required to afford protection to property such as plate-glass display windows of stores. The proposed device is a standard metal barrier placed over the windows to deter breaking and entering. It is proposed that this barrier be charged with a low voltage similar to that used in electric fencing. The energy will not be drawn from the property electrical system but will be supplied by an auxiliary device and will have the capability of being command-initiated.

p. Plexiglass Window Shield: This idea envisions an Acrylic Plastic (Plexiglass) shield placed behind conventional glass windows to withstand heavy impact. Plexiglass is available in various thicknesses and sizes which may be easily cut and installed.

Although these approaches have widely differing characteristics, the street barriers seem to have the common drawback that they obstruct everyone, including control forces (Criteria c and d), and the small barriers appear vulnerable to deliberate countermeasures (Criterion b).

There has been discussion about using chemical riot control agents (RCA's) to form barriers. However, such a practice seems to have numerous shortcomings: there are hazards from accidental contact (Criterion a); the barrier could be penetrated or counteracted by rioters, particularly in the open (Criterion b);

there would be unusual maintenance demands (Criterion f), only partially solved by slow release; the barrier would have a tendency to spread and wander (Criterion h); and there would be at least charges of property damage to be answered (Criterion i). These criticisms of chemical barriers do not necessarily apply to the more temporary use of riot control agents, as in crowd control; therefore, suggestions about possible RCA dispensing mechanisms will be presented under other problem headings.

One other field-expedient barrier should be mentioned: the use of buses or other heavy vehicles to block off streets. Such a barrier has a distinct advantage for situations where crowds are likely to comply with blockades*: the barrier does not confront passive crowds with extraordinary or threatening defensive measures. Also, penetration around or beneath vehicles presumably could be easily stopped by fencing. On the other hand, if attacks on the barriers are expected, vehicles with vulnerable gas tanks might be turned into flaming symbols of disorder.

B. CONTROL OF CITIZENS

To help restore order in civil disturbances, military units frequently have to use methods which go beyond control of the environment to the direct control of the populace. The task of controlling ordinary citizens in a civil disturbance creates a dilemma for military forces. Citizens cannot be treated simply as combatants or as suspect aliens. On the other hand, neither laws nor military organization nor the demands of the situation will permit troops to act merely as an expanded police force. Typically, the military forces are given a variety of control responsibilities which fall somewhere between warfare and police duty. The troops must respond with equipment and tactics that permit a compromise between military and police methods, with restrictions because soldiers are present only temporarily and have a duty to reduce social control problems without substituting new ones. The most important military responsibilities for controlling citizens range from the task of countering snipers and hit-and-run violence, to the complex problems of dispersing or resisting crowds, to the police-like duties of enforcing curfews and apprehending citizens.

1. Sniping

Problem: Both sniping and official responses to reported sniping have become problems of serious concern to military and civilian security forces attempting to control civil disorder. In some past disturbances, responses to incidents of reported sniping have been hampered for several reasons: difficulties in locating and verifying sniper activity, a lack of means to follow minimum-force policies, and sometimes an absence of military assistance to police involved in sniping incidents. The consequences of prolonged gunfire make it important in the future to deal with sniping quickly, accurately, and with a minimum of destruction.

*Cf. the use of buses in Washington, November 1969.

Criteria for Solution: To improve military responses to sniping reports, efforts should concentrate on verification, efficient countertactics, and reduction of damage and injuries. Specifically, countersniping operations should:

a. Require direct evidence or observation of hostile fire. It is essential to reduce the chances of responding aggressively to firecrackers, flashes of light, or ambiguous movements. Responding to false cues can only result in harmful accidents, unfavorable publicity, and an opportunity for dissidents to exploit such cues.

b. Locate the source of fire with a degree of accuracy compatible with available countermeasures. Experiences in past disturbances indicate that troops need mechanical assistance for precisely locating gunfire in built-up areas. It would be desirable to have equipment which offers high accuracy plus

(1) Long-range operation.

(2) Portability.

(3) Effectiveness day or night in various weather conditions.

(4) Low risk of exposing the user to fire.

(5) Usefulness in built-up areas.

c. Make maximum effective use of small, specialized troop units. FM 19-15 argues for antisniper patrols because the problem requires special countermeasures and because incidents may be scattered and sporadic. The probable disadvantages of massing larger units against a sniper should also be emphasized: greater difficulties of coordination and weapons discipline, a resultant bias toward large-scale tactics (otherwise assembling so many men is meaningless), and a large number of targets for the sniper. The antisniper patrol concept is reportedly being implemented.

d. Have clearly established lines of command and coordination, particularly when both police and military personnel participate.

e. Permit variation of tactics. Control forces should be prepared to respond with several types of non-lethal weaponry. Snipers should be faced with an opportunity to cease firing and surrender without injury. These suggestions are consistent with the policies of FM 19-15.

f. Use techniques to deprive snipers of any advantages of relative height, darkness, secrecy, and distance. Such techniques should augment and go beyond the existing doctrines for clearing buildings.

g. Provide maximum possible protection of military personnel.

h. Prevent further entry of citizens into the area within range of suspected sniper activity. This criterion is already stated in FM 19-15, but

deserves to be repeated (there may be an influx of people during the verification/location process), because it may create manpower demands which must be compatible with Criterion c.

i. Provide maximum protection to citizens who are within range of sniper activity or official countermeasures. Military forces must not only avoid harming citizens but must be prepared to take positive steps to protect them.

j. Minimize damage to property.

Potential Solutions: The most likely technical breakthrough in sniper control will be improved verification and location of gunfire (Criteria a and b). There is already a QRMO established for a Small Arms Fire Locator (Urban Environment) which covers much of the two criteria, although the QRMO description does not indicate the effectiveness required of the system in varied illumination and weather, or the user's exposure to fire. Several other concepts which might be an aid to sniper detection are as follows:

a. Bullet Detector Radar: This doppler radar device, developed by Cornell Aeronautical Laboratory, Inc., would detect projectiles moving in the velocity range of most small-arms fire (600-4,000 ft/sec). The system would indicate direction and distance to the firearm. Tests indicate the feasibility of a system with a 300-meter range operating in an ordinary police patrol car.

b. Building Doppler Radar: A CW, UHF, doppler radar was developed by LWL to provide a means for detecting snipers in buildings. The system has a 40° to 60° beam-width. It was designed to determine azimuth and elevation of a moving man through 12 inches of concrete from a distance of 300 feet.

c. Closed-Circuit TV: A high-resolution, closed-circuit television system (developed by various manufacturers) consists of a camera unit and a remote-control unit, capable of operating as far as 1,000 feet apart.

d. Low-Light-Level TV: This TV is similar to c above, but it employs image-intensification techniques for night surveillance. It also has been developed by various manufacturers.

e. Night Window: Kollsman Instrument Company has developed a low-light-level-TV-type system which presents a real-world image superimposed on a vehicle (automotive or aircraft) window. Images are projected on a transparent plane mounted inside the vehicle windshield and appear in the same scale as the real scene.

f. Fiber Optics Periscope: Use of fiber optics could provide the basis for a flexible telescope. With a maximum angle approaching 180°, one could examine the opposite side of a wall or a bulwark without undue exposure.

Most of the other criteria can be dealt with through planning and training. Cordoning off the sniping area (Criterion h), however, may call for new kinds of barriers (Problem A.6). It might also seem that requirements for countering snipers (Criterion e) and for increasing their vulnerability (Criterion f) would invite some suggestions about such items as chemical grenades and bright lights.

However, Criteria e and f touch on a complex problem which needs more study. The right approach for stopping shooting will be affected by the number of snipers and their supporters, the number of people vulnerable to the weapons of either side, the ability of a sniper to move about, and the chances of getting a sniper to react rationally. Therefore, it will take some intensive research to establish clear guidelines concerning when to deal with sniping at a distance or at close quarters (considering number of snipers, maneuverability, and risks of injury and damage); concerning reliance on a single type of non-lethal weapon (CS dispensers) or use of multiple systems (possibly blinding lights or weapons-disabling substances); and concerning when to isolate or spotlight a sniper (chances of forcing surrender vs. precipitating a shoot-out). No single set of answers is likely to be helpful in all cases.

2. Hit-and-Run Violence

Problem: Civil disturbances are not characterized only by large, angry mobs or throngs of looters. Recent disturbances have been marked by numerous scattered acts of violence, committed on-the-move by individuals or small groups of rioters*. Such hit-and-run tactics prolong disturbances and are particularly exploitable by groups ideologically committed to creating disorder**. Standard military riot control formations and crowd dispersal techniques may be inappropriate or inefficient for countering this threat; consequently, it would appear prudent to investigate possibly more effective ways to stop hit-and-run activity.

Criteria for Solution: Effective military action against hit-and-run violence must be based on two principles: strengthened small-unit operations and improved coordination with citizens, police, and other military units. In particular, the military response should rely on:

a. Deployment of small, combined mobile units (police + military) in riot-affected areas where crowds are absent. Such units would be an extension of the motor patrol concept (FM 19-15, para 7-13) to allow wider area surveillance, active intervention in cases of small-scale violence (bomb-throwing, breaking and entering, street fights), and effective pursuit of mobile rioters***. Rapid reinforcement could be provided according to pre-established plans, coordinated by continuous communications with higher headquarters.

*Cf. accounts of looting, vandalism and arson in Washington, DC (1968) and Cleveland, Ohio (1968).
**Cf. the disruptive tactics used at the University of Wisconsin (1969) and San Francisco State College (November 1968), as well as the mobility of protestors in the People's Park episode in Berkeley, Calif. (May 1969).
***An example of specialized small-unit organization is the SWAT (Special Weapons and Tactical Team) developed by the California National Guard.

b. Weapons permitting graduated use of force. Development of hardware for different types and degrees of non-lethal force would enable commanders to match their control efforts to the demands of particular incidents of disorder.

c. A capability for immediate communication between any units engaged in operations against hit-and-run violence. Such network organization is essential for coordinated movement and quick reinforcement.

d. Active encouragement of citizen efforts at self-policing. Such encouragement must be based on cooperation and coordination with local police and civil authorities. Residents of riot areas are the people most likely to be aware of and to suffer from acts of hit-and-run violence. They should not be denied opportunities to discourage violence among themselves and to provide information about control problems, so long as they do not take defensive measures into their own hands*. Youth patrols in recent disturbances were a form of citizen support which created local confidence in self-policing and more cooperative attitudes toward the suppression of violence**. However, self-policing should involve responsibilities not only for special organizations but also for ordinary citizens.

Potential Solutions: Aids to mobility have already been discussed in Problem A.2 (Deployment of Forces). Concepts relating to non-lethal weapons and graduated force will be reviewed in Problem B.3 (Crowd Control), where considerations such as precision and the desired results of force will be taken into account. However, it is worth noting here that controlling hit-and-run violence is even more likely to demand precise, narrow-range control weapons than is crowd control.

It has been suggested that hit-and-run activity can be significantly reduced by cordoning off riot-affected areas. If disorder tends to be focused in a relatively small area (such as a park), this may be a reasonable solution, provided that control forces are prepared to handle assaults on the cordon and rights of access in ways which will not become a focus for escalated violence. However, as the high-risk area is enlarged, problems of penetration, interference with legitimate movement, and control of the enclosed populace (whose evacuation becomes increasingly impractical) grow more severe. Cordoning off large, heavily-populated areas would seem to involve difficulties greatly exceeding those of curfew enforcements (Problem B.4).

One special problem of dealing with hit-and-run rioters is patrol planning. Such planning will ordinarily include not only assignment of sectors but also variation of routes and timing. However, it is not clear that coordination between patrol units insures that area coverage is relatively constant and that there will be compensating routing when some units are tied down by incidents.

*Possible contributions and problems of citizen patrols are described in "Vigilantism of the 1960's," the epilogue to Chapter 5 of The History of Violence in America, edited by Ted Gurr and Hugh Graham, Bantam Books, 1969.
**Compare the case materials and conclusions in "Youth Patrols: an Experiment in Community Participation," by Terry Knopf, Brandeis University, 1969.

In short, at any given time there may be "holes" in the area security, and there may be ways to decoy patrol units into creating these "holes." These facts are not likely to be overlooked by the more deliberate rioters. The solution would seem to be a well-integrated patrol plan which includes contingency arrangements if one or more units must leave the pattern. While such a plan must be tailored to the riot setting, it would be worthwhile to establish enough general features of integrated patrol planning in advance so that any field commander could adapt a plan to his specific location with little difficulty.

Patrolling can help both to prevent violence and to respond to it. However, prevention and quick response may each require additional specialized techniques, and choosing and balancing these techniques may necessitate some intensive study. For example, it may be valuable to prevent hit-and-run violence in some locations by constructing protective barriers; but how many places can be shielded in this way, and how long will the barriers resist attack? Another preventive measure would be surveillance; how sensitive would this surveillance have to be, and how widespread? Concerning quick response, one requirement may be a capability of small units to apprehend and detain rioters; how many should a patrol unit be able to subdue, how should they be restrained, and how should they be removed from the area? There are also potential conflicts in trying to achieve both prevention and quick reaction. Will it be more desirable to discourage rioters by making violence difficult to carry out or by increasing their fear of being quickly caught? Should patrols be ready to respond to any and every incident, if each incident takes time away from thorough patrolling of an area? Questions like these will call for careful scrutiny of recent experiences and systematic comparison of different strategies.

3. Crowd Control

Problem: The traditional focus of civil disturbance control is the task of resisting and dispersing crowds. The standard method for dealing with a troublesome crowd was to mass troops before the crowd in a show of force, order the crowd to disperse, and then hasten the movement of people by sending troop formations against or into the crowd. Today it is rarely practical or desirable to employ this entire procedure without variation. Decisions about dispersing, containing, or diverting crowds, and decisions about the means for executing these maneuvers, are open to many choices and uncertainties.

Criteria for Solution: A military force trying to control a crowd should have equipment and organization giving the field commander a wide range of options for handling crowd participants. Military resources should also enable the commander to control the consequences of any tactical decision, such as the way in which a crowd disperses. The range of available control measures should provide a maximum of opportunities for crowd members to avoid violent confrontations. To achieve these goals, military control forces should:

a. Have the capability to move large troop units quickly, simultaneously, and repeatedly to multiple locations in a riot-affected area. This capability may not require major changes in equipment or structure of military units, but

it will give increased importance to committing manpower and equipment for fast, large-scale transportation over short distances and for making some units continuously mobile. Companies or even battalions of troops may be needed to rapidly provide deep defense of a wide front against mob attacks or resistance. Even if locations of crowd activity are limited in number, they may not be easily predictable for pre-positioning troops. A multiple deployment capability should permit control of several concurrent crowds or defense against a surge of relocated violence following crowd dispersion.

b. Be equipped with a variety of non-lethal devices for dispersing crowds. The variety should permit better adaptation to differences in situations, should prolong the opportunities for crowd members to disengage from further resistance, and should deprive extremists of any chance to bring about a deadly confrontation. The advantages of effective non-lethal force are well-known: reduction of bloodshed, reduced risks of escalating violence, and avoidance of adverse public reaction to civilian casualties. Having several different weapons available at one time will permit control of rioters who are prepared to counteract any one device; it will permit composite tactics that overcome limitations of single weapons (such as short range or weather vulnerability); and it will reduce the need to resort to lethal weapons.

c. Have the capability to remove selected individuals from a crowd with minimum necessary force. It is desirable to keep individuals who are most likely to commit violence from inciting the entire crowd to action. The objective is to prevent or avoid any action which would stimulate violent response from a not-yet-uncontrollable crowd. It is important to note that those persons most likely to commit violence (for instance by throwing objects) may not be spokesmen for the crowd and may be located well to the rear. There should be an emphasis on developing methods for dealing with inconspicuous individuals not located in the front edge of the crowd.

d. Expand the range of force levels immediately available for use against crowds. At the lower end, there should be tactics which permit operations in close contact with crowd members when necessary, without risking provocative accidents (e.g., shoving against bayonets) or premature dispersal. Higher levels of force which are still non-lethal should be available to back up control efforts without hastening a deadly confrontation. With a wide range of available force, the military commander can place the responsibility for escalating violence squarely on the crowd. The ability to use graduated force will of course be closely linked with the availability of varied non-lethal weaponry (Criterion b).

e. Communicate to all members of the crowd directions and warnings which clearly define the consequences of their actions. Satisfying this criterion requires an ability to communicate throughout the crowd and above its noise level. It also requires giving the crowd clear, reliable information to directly counteract the inevitable confusion, uncertainty, and disbelief. Such information should not demand impossible responses (such as rapid movement by all members of a large, compact crowd). Success of communications may sometimes be enhanced if crowd members have opportunities to communicate with the security force commander.

f. Not always force dispersal where there is a likelihood of turning a non-violent crowd into a violent one. The legal rights of citizens must be protected, and sometimes this protection will justify dispersing a crowd. However, there is a risk that a dispersed crowd will spread disorder over a wider area and will engage in worse forms of violence than before*. There is also a risk that crowd-control methods will have such widespread or injurious effects that they will help to recruit opposition to control forces. In such cases, the risks may argue against a rightful but unnecessary attempt to break up a crowd.

g. Have a policy of making fullest possible use of self-policing by crowd members. This policy increases the chances that a commander can avoid using his weapons and that troops can avoid direct conflict with crowd members. It contributes to the emergence and maintenance of crowd leaders who are willing and able to negotiate cooperation. Finally, through these leaders, it allows for more effective communication between the field commander and the crowd. Police experience with the majority of participants in the Washington Vietnam Moratorium, 13-15 November 1969, is a recent confirmation of this policy.

h. Be able to observe an entire crowd continuously. Many problems and mistakes of crowd control can result from confronting a large crowd only frontally and at ground level, with little immediate knowledge of what is occurring in the center, at the sides or at the rear. Although present doctrine calls for securing rooftops and streets in the vicinity of the crowd, surveillance may have to be augmented if these posts are some distance from the crowd itself and if events proceed too quickly, as in the case of a moving crowd. Continuous all-around surveillance is needed to anticipate actions by crowd members and reactions to official information, instructions, or dispersal tactics.

i. Be equipped and trained to control and disperse people in any area of a crowd. This entails more than creating pressure on the front edge and panic in the center. There should be ways to enforce directed, orderly movement along selected routes with coordinated control of all sections of the crowd. It should also be possible to act on limited groups within the crowd, either to quiet a localized outburst or to carry out sequential dispersal. The ability to so maneuver crowds will depend in part on developing more precise and well-integrated tactics for using non-lethal force.

j. Utilize multiple departure routes. A crowd that is moved along a single exit route is likely to run into bottlenecks, to disrupt normal traffic and activity en route, and to cause a maximum of unpreventable destruction along the way. Keeping the crowd together is also likely to increase its sense of unity and purpose.

k. Guard the departure routes. Military supervision of crowd movement should go beyond blocking undesirable routes to help accomplish several other

*This was demonstrated on a small scale in Plainfield, NJ (1967) and on a larger scale at the 1968 Democratic Convention.

goals: preventing a crowd from reassembling, maintaining crowd movement and diverting cross-traffic, protecting against property damage along routes of movement, preventing crowd members from becoming involved in violent incidents, and enabling security forces to detain any individuals who attempt to interfere with peaceful dispersal and departure. Because stationary guard details would require large numbers of men and might both add to tensions and risk attack, some form of mobile patrolling should be considered where feasible.

l. Prevent reassembly or activity of hostile groups in the cleared area. There must be some protection of the scene of crowd activity after the crowd departs. This protection should create a minimum of interference with normal movement and activity in the area, to avoid giving a basis for feelings about a military takeover (the possible result, for instance, of troops completely closing off an empty park).

m. Be able to use dispersal techniques which are rapidly effective. Crowds attacking troops, other citizens, or property must be stopped quickly.

n. Employ methods for denying anonymity to crowd members and for identifying them semi-permanently. Anonymous membership in a crowd tends to increase a person's feelings of being invulnerable, powerful, and not responsible for his actions. Techniques which individualize the participants in a crowd, before other means of dispersal are used, may increase the participants' feelings of vulnerability, liability, and isolation to the extent that many will be willing to leave the scene. Many individuals will feel even more at a disadvantage if they know their presence and identity are being recorded. However, recording techniques must not only be evident to the crowd but should also deny individuals the chance to hide amid others and should not expose the recorder (such as a photographer) to attack. Even when crowd members can be openly singled out for identification, this may not discourage highly-committed dissidents, but it should be able to furnish evidence to support any necessary arrests or future charges.

o. Publicize dispersal techniques in advance of use. Publicity about types of control devices and their non-lethality will serve several purposes. It will reduce panic and public outcry when they are used, it will indicate that military forces are equipped to deal with disorder, and it will signify to potential rioters that military forces are not preparing for violent confrontations. In short, publicity about control devices can show that troops are able to handle crowds in a calm and disciplined way. However, publicized control devices will have to be difficult to counteract in advance. Furthermore, the public should be informed about the nature of the devices and about policies for their use, but not about details of tactics and operational characteristics which could be exploited by rioters.

p. Avoid providing crowd members with weapons. Specifically, the methods of dispersal should not give participants anything they can throw back or use in later confrontations either as weapons or as shielding.

q. Have equipment which is relatively unaffected by weather conditions. Weather-sensitive techniques not only limit the effectiveness of control opera-

tions, but also can encourage rioters to make use of adverse weather conditions (such as high winds), which in turn may compel troops to escalate their use of force.

Potential Solutions: There has been considerable effort to find ways to make an unwilling crowd move in a desired direction. The search has emphasized devices and techniques which are rapid-acting, irresistible, and non-lethal. These priorities have led to a de-emphasis on finding methods which take effect gradually (i.e., become harder to resist as exposure time increases) and/or which allow for slow withdrawal. Indications are that most attention has been given to developing new ways for delivering and dispensing chemical agents (CS, in particular), although ideas are also available for use of sound, light, electrical shock, and wind. Apparently, however, there have been as yet no methods using water or movable barriers which promise to be both highly effective and suitable for disturbances of the type with which US troops are concerned.

A chemical such as CS has the virtue of being quick to take effect, safe, and difficult to resist. There are basically two ways for dispensing CS and similar agents against a crowd: by projecting (shooting, throwing, rolling) or by spraying. Besides the two types of CS grenades already "pre-positioned" for civil disturbance troops (M25A2 and M7A3), there are possible "projectiles" such as the following:

a. XM47 CS Riot Control Grenade: This pyrotechnic grenade is housed in a cylindrical rubber container. It can be thrown or rolled by hand and can effectively cover approximately 150 square meters with CS in a 10-15 knot wind.

b. Chemical Grenade, Penguin G-1: This plastic grenade, developed by Penguin Associates, is baseball-like in size and shape and is available loaded with CN, CS, or DM.

c. Chemical Grenade, Penguin G-2: Also developed by Penguin Associates, this plastic grenade, baseball-like in size and shape, is available loaded with CN and green dye, CS, or DM.

d. Chemical Grenade, Penguin G-3: Penguin Associates has developed a metal-canister grenade (with standard military fuze), which is available loaded with CN, CS, DM, or smoke agent.

e. Chemical Grenade, Federal 112: This metal-canister, non-explosive grenade with 25 to 30 seconds burning time was developed by Federal Laboratories, Inc. and is available loaded with CN, CS, DM, or smoke agent.

f. Chemical Grenade, Federal 115: Another metal-canister grenade developed by Federal Laboratories, Inc. breaks into 3 sections, each of which bounces for several yards and burns 20 to 25 seconds. The grenade is available loaded with CN or CS.

g. Chemical Grenade, Federal 120: This metal-canister grenade, developed by Federal Laboratories, Inc., is fire-safe and gives off a special floating cloud of gas. It is available loaded with CN or CS.

h. Chemical Grenade, Federal 121: This Federal Laboratories, Inc. metal-canister, non-explosive grenade is fire-safe and available loaded with CN or CS.

i. Chemical Grenade, Lake Erie 1 CN: This grenade incorporates an aluminum canister and a 4-3/4 seconds burning time. It is available from the Lake Erie Chemical Co. loaded with CN, CS, DM, or a smoke agent.

j. Chemical Grenade, Lake Erie 2 CN: This aluminum-canister grenade is launchable by Lake Erie Grenade Launcher No. 33. The grenade has a 25 to 35 seconds burning time and is available loaded with CN, CS_2 or smoke agent.

k. Chemical Grenade, Lake Erie 3 CN: This aluminum-canister grenade allows an instantaneous discharge or a 2-second delay. It is available loaded with CN or CS from the Lake Erie Chemical Co.

l. Chemical Grenade, Lake Erie Model 34: This Lake Erie Chemical Co.-developed grenade incorporates a blast dispersion discharge and is available loaded with CN, CS, DM, or smoke agent.

m. Multi-Purpose Grenade: AAI Corp. has developed a multi-purpose grenade which can be hand-held, thrown or launched. It is non-explosive and provides an instantaneous discharge, or a 2- or 5-second delay. It is available loaded with CN, CS, or a dye.

n. CS Mini Grenade: This device, developed by AAI Corp., consists of a small canister approximately 1-1/8 inches in diameter and 1-1/4 inches high. Each unit contains an ignition system, a small fuel block, and several capsules of agent CS. Total gross weight per unit is 1.2 ounces. The unit disseminates agent CS as an aerosol for approximately 6 seconds.

o. Handy Andy 2 WRD Cartridges: AAI Corp. has developed a hand-held or pyrotechnic pistol-launched rubbery projectile that disseminates CS agent. The projectile is 7-1/2 inches long, 1-1/2 inches in diameter, and 1/8 inch in wall thickness; it contains 42% CS and the rest is pyrotechnic mix. When fired with an M79 Grenade Launcher, the mixture can be projected to about 70 to 100 yards.

p. Spinning Gas Grenade: This anti-riot grenade, developed by AAI Corp., has delivery orifices so designed and placed that high-velocity exit gases cause the grenade to spin wildly and thereby prevent throwback by rioters. Asymetric distribution of weight will randomize motion.

q. Anti-Riot Dispensing Tetrahedrons: Simple plane-sided (tetrahedron) grenades have been developed by AAI Corp. These grenades tend to remain at the point to which they are thrown and not to roll out of effective range.

r. Hot-Surfaced Grenade: In this grenade the thermal reaction which heats and dispenses an anti-riot gas also heats the exterior surface of the grenades, thereby preventing throw-back by unsuspecting, unprepared rioters. This thermal reaction begins when the grenade is initially released.

s. XM674 CS Cartridge, 40mm: This soft rubber projectile is filled with a CS/pyrotechnic mixture. It can be hand-fired, pistol-fired (using AN-M8 pistol), or fired from the M79 Grenade Launcher (using the plastic adapter). The projectile is propelled by a black powder charge in the cartridge barrel. The CS/pyrotechnic mixture ignites and CS is emitted through four holes in the rubber body. It provides a coverage of 35 square yards.

t. XM651E1 CS Cartridge, 40mm: This cartridge is designed for use in the M79 Grenade Launcher and with the M16 rifle (with XM148 adapter). The cartridge is equipped with an impact fuze and can penetrate a 3/4-inch pine board at 200 meters, with release of the agent after penetration. Coverage for two rounds is approximately 5000 cubic feet.

There are several possible disadvantages of chemical "projectiles." The items themselves may be more dangerous than the chemical inside; in this respect the XM47, Handy Andy grenades, and XM674 have an advantage over the XM651E1. The rioters may also be able to throw the item back at the troops; the spinning and hot-surfaced grenades attempt to guard against this, and decomposing cases would also prevent such use. Other drawbacks of chemical "projectiles" are not as easy to overcome. Although the "projectiles" can be directed into specific areas of a crowd, their chemical contents are still weather-sensitive (in terms of range and direction of effects), and diffusion produces a rather unselective effect which may result in uncoordinated crowd movement.

Chemical sprayers permit prolonged use and control of initial diffusion, but otherwise their strengths and weaknesses are similar to those of grenades. On the ground, spray devices can be varied in size and precision to permit control of individuals or groups; however, these devices are usually not designed or positioned to be able to reach all sections of a crowd immediately. CS dispensed from aircraft can affect an entire crowd at the same time, at the sacrifice of precision. Examples of presently-operational devices include the M3 (man-portable) and the M4 and M5 (jeep- or aircraft-mounted). Other possible dispensing equipment includes:

u. XM33 Dispenser: This back-portable or vehicle-carried dispenser has a 40-foot range in still air. It uses air pressure to dispense micropulverized CS-1 into the atmosphere and can fire in a

single burst from one tank for 50-60 seconds. Its pre-pressurized tanks can be replaced in 3-4 minutes. A version using liquid-CS is presently being evaluated.

v. MK 17 Pepper Fog CS-Tear Smoke Generator: This generator, powered by a 2-cycle lawnmower-type engine, projects a cloud of agent up to 40 ft; ranges up to 200 ft are possible under ideal wind conditions. It has a formulation capacity of 2 one-quart cartridges at one time and the operator has the option of switching from one cartridge to another. Its output is equivalent to 5 burning grenades per minute and its weight fully-loaded is 35 lbs. It was developed by General Ordnance Equipment Corp.

w. MK XII: The MK XII is more portable than the MK 17 above, as it weighs less than 25 lbs. Its output is equivalent to 10 burning grenades per minute, and its fuel capacity allows 45 minutes of continuous operation. It was also developed by General Ordnance Equipment Corp.

x. Turb-A-Fog Tear Gas Dispenser: This 30-pound, two-cycle gasoline engine generator, developed by Federal Laboratories, Inc., dispenses an agent cloud for up to 4-1/2 minutes. An aerosol canister containing the agent is attached to the machine and activated; when the canister is exhausted, the operator may quickly remove it and insert another.

y. Federal Dust Projector 271: This is a small, hand-held tear gas projector developed by Federal Laboratories, Inc. A small control valve permits its operator to control emission rate, and the entire item can be carried in one hand.

z. Dynafog 70: This is a commercially-available insecticide fogger, which is easily hand-carried and operated. It operates on gasoline and uses kerosene or motor oil for smoke-production. CS can be mixed into the smoke-producing agent.

aa. Self-Contained CS Dispensing System: This LWL item is intended to be hidden in an inaccessible location in a building and automatically actuated when a window is broken by looters. It would dispense CS for a minimum of 8 hours. A standard burgular alarm could be used to actuate the system, which could be tied to a special telephone circuit to signal the location to a riot control office.

bb. Controlled Evaporation of Agents: Another LWL concept envisions conversion and utilization of aircraft-mounted, crop-spraying technology and equipment to disperse an encapsulated, noxious compound in areas to be denied. The capsules would be activated at a controlled rate (by wicking).

cc. Helicopter Riot-Gas Disseminators: These are similar to agricultural aerial fertilizer and insecticide disseminators.

dd. Hand-Held Pressurized Dispensers: This LWL concept would employ conventional, air-pressurized, water-type extinguishers to disseminate materials, such as food-coloring syrup, stenches, etc., which are identifiable but not harmful.

ee. CS Sprinkler: Another LWL concept envisions a CS dissemination system, similar to a water-sprinkler system, that can be initiated when a window is broken, door forced open, etc.

ff. Demountable Anti-Riot Gas Dispenser: Canisters with screw-on adapters to fit sockets inside a commercial establishment could be activated remotely. These dispensers could be used in normal electrical sockets and activated by switching on a light at night. For safety, they could be removed during periods of normal operations.

gg. CS Canister: This slowly-discharging, thermally-disseminating CS canister is placed near a possible target and triggered by a rioter on his way to the target. This is an LWL development.

hh. Pick-Axe Tear Gas Dispenser: Federal Laboratories, Inc. has developed a tear gas dispenser in the shape of a pick-axe, which can be pounded through a wooden door to release its agent into a building. The head of this dispenser is connected to a gas reservoir via a reinforced tube.

ii. XM30 Dispenser: This is the standard 1-1/2 quart M11 decontamination unit modified to spray CS in a slurry solution with water. Nitrogen cylinders provide pressure for a 30- to 35-foot range and one square foot of coverage for a hand-fired burst. The jet stream can be maneuvered by hand.

jj. XM32 Dispenser: This hand-held dispenser (length: 6-1/2 inches) projects a nitrogen-pressurized stream of 1% CS triocty phosphate (TOF). Its effective range is 15 feet, and its continuous discharge time ranges from 14 to 19 seconds. A plastic safety cap prevents unintentional discharge.

kk. MK II Pocket Projector: This item, developed by General Ordnance Equipment Corp., has a capacity of 8 one-second bursts. It operates in the range of 8 to 10 feet.

ll. MK IV Chemical MACE: This General Ordnance Equipment Corp. item fires a shotgun pattern of heavy droplets of a special liquid-CN formula. Its range is 15 to 20 feet, and it provides an average of 50 one-second bursts.

mm. MK VII Chemical Baton: The MK VII Chemical Baton is available from General Ordnance Equipment Corp. in three different lengths: (1) a 12-inch baton, (2) a 20-inch baton, and (3) a 26-inch baton. A refillable replacement kit is also available.

nn. MK IX: This General Ordnance Equipment Corp. development has a greater capacity, higher flow-rate, and longer range than the MK IV (item 11 above). It has a gross weight of 700 grams; a net weight of 520 grams; a length of 8-3/8 inches; and a diameter of 2-1/2 inches. It provides a range up to 30 feet with 37 one-second bursts.

oo. Model 140, Partner Industries of America, Inc.: This chemical spray device has a capacity for 40 one-second bursts, with an effective range up to 20 feet. Its length is 6-3/8 inches and its diameter, 1-1/2 inches. It has a gross weight of 147 grams and a net weight of 104 grams.

pp. Model 108, Partner Industries of America, Inc.: This chemical spray device has a capacity of 8 one-second bursts, with an effective range up to 6 feet. It has a length of 4-3/8 inches; a diameter of 5/8 inches; a gross weight of 25.5 grams; and a net weight of 9 grams.

qq. Curb 60: Port 02 Matic Sales Corp. lists a chemical spray device with a capacity for 60 two-second bursts. It provides a range of 15 to 20 feet, and has a net weight of 12 ounces.

rr. Police Model AP-18: Penguin Associates developed this chemical spray device incorporating a stinger aerosol pressurized stream. It has a capacity for 70 one-second bursts to a range of 20 ft. It is recommended for selective use against an individual.

ss. Police Model AG-12: This is another Penguin Associates device incorporating a stinger aerosol pressurized stream. Its capacity is 70 one-second bursts to a range up to 20 feet. It is recommended for use in quickly disabling several opponents.

tt. 10-4 Chemical Billy AG-20: This item provides a stream of CN and was developed by Penguin Associates.

uu. HELP: This is a tear gas tank, capacity one gallon. It comes complete with harness, tanks, controls, and sprayer. Replacement refill tanks are available. HELP was developed by J. M. Sales, Inc.

vv. Tear Gas Streamer No. 280: Federal Laboratories, Inc. developed this item with a capacity of 50 to 75 bursts. It has an effective range up to 20 feet and an effective duration of 15 to 20 minutes. A holster can be obtained with the streamer.

ww. Tear Gas Mini Streamer No. 282: Another streamer developed by Federal Laboratories, Inc. has a capacity of 30 to 35 bursts, an effective range up to 14 feet, and an effective duration of 15 minutes.

xx. Liquid Chemical Dispenser Concept: At present, the US Army utilizes a back-pack flame-thrower device (XM33) which dispenses dry CS for short distances. Disadvantages of this system lie in the fact that a dry agent is greatly subject to wind effects and is quite limited in range. The proposed system would be similar to these flame-thrower type devices except that it would dispense a liquid that contains a non-lethal chemical agent. It would be a man-portable, pressurized, liquid dispenser capable of dispensing liquid up to a distance of approximately 120 feet. The distance of projecting a liquid stream would be controllable for the application at hand. Provision should be made for remote-control operation when mounted on a police van which is used to transport detainees, or on other types of inclosures. This would provide a means of controlling those within. In addition, the device might be mounted on helicopters for overhead control of crowds. A marking agent could be added to the basic liquid to provide a method for identifying rioters.

With so much attention being given to chemical riot control agents, it is worthwhile to underline two developments which might remove some of the deficiencies of present devices. One is the attempt to develop liquid sprays whose greater density and narrower dispersion would reduce some of the weather-sensitivity and unselectivity of CS weapons. The other development would be precision tactics using well-defined sprays and prevailing air currents to maintain selected escape routes for rioters and to permit gradual and piecemeal departure of crowds.

Whatever improvements are made in the use of chemicals, they are only one mode of crowd-dispersing weapons, and they are now subject to countermeasures by rioters. Other types of non-lethal crowd-control methods may become important as backups or alternatives to chemical agents. One control method which has been suggested is the use of sound:

yy. "Teleshot" Sound Device: This device is a cartridge which is used to control bird damage to farm crops and aircraft. The cartridge projects a powerful sonic device approximately 200 yards. The device functions in the air and provides a loud noise, a flash and a small cloud of smoke. The cartridges are bore-safe and non-lethal if fired from semi-automatics over the heads of crowds. They are commercially available from the Colt Pyrotechnic Division.

zz. Very-Low-Frequency Sound: An infrasonic energy generator to induce both physical and physiological effects is a development of the US Air Force.

aaa. Sound-Producing Device: Astrosystems International, Inc. has developed a high-intensity sound generator, consisting of two intersecting hot-gas jets. It produces an overall sound pressure level of approximately 126 db at 500 feet, with most of the energy between 2.5 and 80 CPS.

Another general crowd-control method under discussion is the use of lights to temporarily blind or disorder rioters. Several bright-light devices discussed as illumination sources (Problem A.3) might be applicable for this purpose. Light and sound may be non-lethal control methods, but they may also cause lasting injuries which could have as negative an effect on control efforts as deaths would. Furthermore, although light and sound can effectively interfere with crowd activity and may create an unbearable environment, it is not clear that crowd members would flee from the scene as a way to neutralize the weapon effects. To get crowds moving, there are some other hardware concepts which might be directly effective:

bbb. Multiple Cattle Prod Boom: Envisioned here is a boom fitted with multiple cattle prods attached to a tractor-mounted telescoping arm. Its purpose would be to sweep crowds off a street.

ccc. Extended Electrified Boom w/Vehicle: A vehicle with extensions which reach from curb to curb is being used by riot control forces in West Berlin. The rioters touching the vehicle receive an electrical shock. The carrier vehicle is a modified armored personnel carrier, and the boom is a fence-like fitting on the front which extends a foot past each side of the vehicle. Attached to each end of the boom is a section which folds back about 3/4 of the length of the vehicle and may be swung forward to present a barrier.

ddd. Electrical Shock Device: Several police batons of standard dimensions have been developed by Shok Baton Co. and Scope, Inc. with the capability of delivering a relatively harmless electric charge of low amperage and high voltage. The Shok Baton devices are powered by three to seven standard, type-C flashlight cells that deliver a harassing shock. No current or electricity passes thru the skin. The effect, felt only at point of contact, is similar to a bee sting, but not nearly as dangerous.

eee. Air Blast: High-velocity air blasts have been used by the French in anti-riot operations. The units are essentially small aircraft engine/propeller combinations. Possible variation could include heated air and a stream of water directed into the air blast to form a drizzle to be directed onto the rioters. The effects of wind on speechmaking and thrown objects should also be considered.

Both the electrical and wind devices have the limitation that they have the most effect on the edge of a crowd (which may be immobilized by the pressure of un-

affected people behind). This limitation also raises the question of what will happen to people who cannot get out of the way quickly.

If problems of moving crowds are overcome, this is by no means a complete answer to crowd control. For instance, there will still be a need to communicate with crowd members. In addition to existing equipment, the following items might help toward meeting this need:

fff. Public-Address System: Penguin Associates has developed a helmet-mounted public-address system. It is a 25-watt transistorized unit with 360° sound projection to 200 yards range. The speaker is mounted on top of the helmet; the microphone is also helmet-mounted and positioned in front of the user's mouth so as to discriminate against background noise.

ggg. Hailer or Porta-Chief: A hand-held, pistol-grip, electronic megaphone has been developed by Audio Equipment Co.

hhh. Voice Gun: Another hand-held electronic megaphone with pistol grip has been developed by Federal Sign and Signal Co.

iii. Public-Address System Concept: This concept envisions a PA system with a highly-directional loudspeaker for hand-held or vehicle-mounted use.

jjj. Mobile Public-Address System: Many manufacturers produce vehicle-mounted PA systems. The amplifier is normally mounted under the dashboard and the system operates from vehicle power. Power outputs up to 100 watts are readily available.

kkk. AEM-1 Loudhailer: Applied Electro-Mechanics, Inc. has developed a compact, transistorized, helicopter-mounted PA system of 350 watts output. It operates from a 28V DC aircraft electrical system and can cover 1 sq mile from an altitude of 2,000 feet.

lll. Public-Address System Concept: Envisioned in this concept is a remotely-operated PA system, connected by radio link to a remote transmitter by use of radio relays.

Equipment development will have to take into account desirable distances between control forces and varying numbers of rioters. In addition, consideration must be given to providing crowd members with suitable access to communications, for instance for self-policing. Some means for informing the speaker about crowd response may be desirable.

To see and record crowd members in action, Federal forces presently have provisions for motion picture and still photography, and both Federal and National Guard units will employ Polaroid cameras. Other concepts which may be helpful in the future are:

mmm. Long-Range Directional Radar: This LWL pulse doppler radar development is intended to measure the azimuth and range of men and vehicles to within 5° and up to 1500 feet, respectively. It is also intended to detect targets through building walls, but with reduced range.

nnn. Closed-Circuit TV: (See above, item c, page 28).

ooo. Low-Light-Level TV: (See above, item d, page 28).

ppp. Video Rover Recorder: Sony Corp. has developed a lightweight, self-contained video recording system consisting of a hand-held TV camera and a shoulder-hung recorder. It includes a zoom lens.

qqq. Porta-Pack TV Recorder: A recorder similar to the Video Rover Recorder above has been developed by General Electric Corp.

rrr. Infrared Movie Camera: Various manufacturers have developed hand-held movie cameras using infrared film and infrared lights to provide documentation of criminal activities.

sss. Stereometric Cameras: Some tripod-mounted stereo cameras, developed by Transmares Corp., provide highly detailed photographs of evidence on 3-1/2 x 4-1/2 inch negatives. These cameras, which have electromagnetic shutter-tripping and include built-in leveling devices, use wide-angle lenses with shutter speeds up to 1/400 second. The focusing range of the SMK 120 is 16 feet to infinity; for the SMK 40, 8 feet to 33 feet.

ttt. Miniature Concealed Camera: A wrist-worn or otherwise concealed camera is envisioned to gather evidence and provide documentation.

uuu. Alarm-Box Camera: This camera would be installed semi-permanently in fire and police alarm-boxes and would require a wide-angle lens to assure an adequate picture of an individual pulling the alarm. Automatic film advance would be required.

vvv. Audio Tape Recorder: Portable audio tape recorders to document events and arrests are manufactured by many commercial firms. However, methods of identifying tape segments for correlation with other forms of information (photographs, etc.) are necessary.

www. Communications Logger: Stancil-Hoffman Corp. produces a multi-channel, audio tape recorder. It is designed to handle 24 hours of messages on a 1/4-inch tape and records 2-way radio telephone and bugging device messages.

Crowd members will often have to be dealt with as individuals because they must be restrained or because their identification will assist future control efforts. Techniques for helping to restrain individuals will be covered under Problem B.5 Apprehending and Detaining Citizens. Detailed identification of individuals will be discussed in connection with Curfew Enforcement (Problem B.4) and Apprehending and Detaining Citizens (Problem B.5). However, there are certain specialized techniques available for identifying participants in crowds, even after the crowds are dispersed:

xxx. Gelatin Marking Capsules: Rifles and pistols firing gelatin capsules containing paint are presently available. These permit the marking of people or vehicles to distances of 80 feet with persistent dyes.

yyy. ID Marker Munition: This concept involves a proposal for the development of a 40mm marker projectile which can be fired from the M79 Grenade Launcher. The projectile would incorporate a standard M118 or XM195 cartridge case with a reduced propelling charge. It would consist of a pyrotechnic fuze, the projectile body, a frangible payload canister containing bright paint or other dye markers, an expulsion charge and a small burster charge. The burster would be set to explode the payload approximately 15 feet above the heads of rioters. The system would provide a range of 50 to 100 meters.

zzz. Personnel Marker Grenade: This LWL development is for a hand-thrown, non-lethal, non-toxic, non-irritating explosive device which when activated would cover a small group of people with uniquely colored and/or odoriferous chemicals.

aaaa. Flourescent Marking Powder: Envisioned in this concept is a flourescent powder sprayed into crowds from pressurized containers such as the dry fire-extinguishers. Small-sized particles will adhere to most clothing and skin and will not be readily visible until viewed under ultraviolet light.

bbbb. Innocuous Tag Concept: This concept envisions invisible "dyes" added to CS or similar-type sprays or streams used in mob control which would flouresce under UV radiation.

The advantages of these marking methods are that they can potentially provide a non-lethal, non-hazardous, indelible identification which will rob a rioter of his protective anonymity and will incriminate him if he engages in further riot activity (for instance, trying to slip past curfew checkpoints). There are some specific flaws to be corrected: the containers for marker munitions should not be dangerous (when they explode) or useful to rioters, and the spread of indelible dyes should not mean indelible property damage. However, the major limitations of crowd-markers may have to do with their use as evidence. Being marked will mean an individual was present at a certain place, but it may not clearly indicate what he was doing there. Furthermore, if dissidents can succeed in imitating the marking material, they can create enough

false markings to ruin the value of the technique for evidence. These limitations can possibly be overcome by more sophisticated marking methods.

Crowd control poses numerous problems which would benefit greatly from intensive research. Three of the more basic problems are mentioned here to illustrate the research need. First, the policy of using minimum force deserves further examination. Results of displaying and using different kinds of force should be systematically compared, not only in terms of their immediate effects on crowd behavior, but also in terms of their longer-term relations to behavior patterns of rioters and non-rioters. For instance, it is important to be sure that avoiding the use of firearms, even in the most violent disorders, is not related to longer or more severe problems for control forces.

A second issue is how to decide when a crowd cannot merely be contained but must be dispersed. Although FM 19-15 seems to make dispersal a standard policy, several facts must be taken into consideration:

- The likely responses of crowd members if they are kept in one place for varying lengths of time.

- The amount and type of force required to disperse the crowd.

- The consequences of the dispersal process: behavior of crowd members and effects of crowd movement.

- The possible actions of crowd members once they have moved beyond the area of intensive official control.

The question is not simply whether to disperse or to contain, but rather how to gauge the timing of a dispersal operation. Although the decision to disperse a crowd will demand a commander's judgment in each separate incident, troop leaders could profit greatly from detailed guidelines based on a thorough review of numerous past experiences.

A third subject needing study is the speed of control operations. How much time should crowds have to voluntarily comply with instructions? Either too little or too much may lead to unnecessary violence. If it is necessary to force the departure of a crowd, how fast should they be forced to move so that troops can control and direct their responses? Finally, if crowds show resistance to control measures, how quickly should troops increase their use of force? While none of these questions may have simple or authoritative answers, an analysis of past events should be able to produce recommendations of ways to minimize risks of adverse outcomes.

4. Curfew Enforcement

Problem: A curfew should be one of the most effective tactics for controlling civil disturbances. Analysis of a subsample of twenty disturbances involving curfew enforcement shows that it almost never leads to any sudden increase in the level of violence*. The curfew should remove innocent people from the

*The exception is the disturbance in Chicago at the 1968 Democratic Convention, where curfew enforcement served as a pretext for violent confrontation.

streets during the peak hours of rioting and it should deprive purposeful rioters of their audience and the safety of numbers, making them more visible and legally vulnerable. However, the effectiveness of curfews in the past has been limited by difficulties of enforcement: manpower and equipment have often been insufficient to catch all the violaters and at the same time insure enough discrimination to avoid interfering excessively with persons on legitimate errands.

Criteria for Solution: A more effective curfew depends on the improved capability of control forces to locate, identify, and intercept violaters. Improvements should result from:

a. Coordination of the size of the curfew area with the availability of manpower (military and police), to insure the capability of inspecting all traffic in the area. The initial ineffectiveness of curfews in Detroit (1967), Wilmington (1968), and Baltimore (1968) can be blamed in part on shortages or scattering of control forces. As interviews after the Washington (1968) riot indicated, rioters will be quick to take advantage of weakness in curfew enforcement. For adequate enforcement, the number of control forces and their mobility must be factors limiting the curfew area.

b. Organization of communications to produce increased sensitivity to persons traveling through the curfew area repeatedly, or under false pretenses, or to escape arrest. Individuals should not be able to pass illegally through a checkpoint because troops there are unaware of what has happened elsewhere.

c. Use of indelible, non-transferrable, and non-forgeable marking of persons who have legitimate reasons for being in the curfew area. Residents, emergency personnel, and night-shift employees may need to move about in the curfew area. Marking applied when the individual passes his first checkpoint can save both citizens and troops from the nuisance of unnecessary inspections, and unlike an ID badge, cannot be lost or stolen. If the marking is known and detectable only by control forces, then the risk of forgery is reduced. The marking process should be as simple as possible and should in no way be made to appear derogatory to citizens. Markings should be changed periodically as a check on people who might exploit their opportunity to remain active in the curfew area.

d. Use of unmanned detection devices to signal movement at locations without checkpoints in the curfew area. This measure will help to prevent and discourage people from trying to slip past checkpoints via alleys and side streets. It will also enable greater reliance on mobile patrols to enforce the curfew, resulting in lower manpower requirements. Detection devices should not be susceptible to tampering and should permit accurate location of a warning signal.

e. Use of devices to permit surveillance under conditions of low illumination. Past riot experience indicates that troops will have to enforce the curfew sometimes in bad lighting conditions. It is also likely that purposeful rioters will take advantage of darkness and even cause it. The ability to

carry out surveillance despite poor lighting will both increase operational effectiveness and reduce risks for control personnel.

Potential Solutions: One aid to curfew enforcement may come from remotely-operating devices to detect intrusion in the curfew area. Among the concepts for possible application are the following:

a. Intrusion Detector, Types W676C and W768A: These acoustic intrusion detection systems were developed by Honeywell, Inc. The sensors may be located as far as several hundred meters from the monitoring panel by wire (actual distance depends upon sensor impedance). The systems can be operated from AC power lines or batteries.

b. Intrusion Detector; Model T-70, R-70: Tracer Systems has developed a remote acoustic intrusion detector in which a sensitive microphone is coupled to a radio transmitter (T-70) which sends a signal to a receiver (R-70) at distances up to 1.5 miles. The device is claimed to be sensitive enough to pick up whispers at 25 feet and is operated from 117V AC or 12V DC.

c. Microwave Intrusion Detector: This detector system consists of a doppler transmitter/receiver unit and a remotely-located control unit. Any motion occurring within the antenna radiation field gives a visual and audible alarm and provides a signal to actuate remote alarms. It has a detection range of 250 feet and operates from 117V AC lines or batteries. It was developed by Advanced Devices Laboratory.

d. CW/UHF Doppler Radar: A miniature UHF doppler radar, approximately the size of a cigar box, has been developed by LWL. It can be used with either an omnidirectional or directional antenna to vary coverage, and detection ranges up to about 300 feet (depending upon antenna type) are attainable. Radio relays for remote monitoring of alarms can be included.

e. IR Intrusion Detector: Barnes Engineering Co. has developed a passive infrared detection system in which the narrow field-of-view forms a line barrier. The system measures the change in temperature at ranges up to 750 feet. The system operates from batteries and consists of a detector unit and a remote alarm unit. Wire or radio links between units are available.

f. Intrusion Detection Using Image Storage Tubes: An intrusion detection system now under study by Philco-Ford uses image storage tubes. A TV-type display would indicate only changes in the field-of-view of the camera, thereby indicating the presence of moving targets.

The nature of these devices suggests that control forces may have to weigh the advantages of sensitivity against the need for selectivity. A device must be

sensitive enough to pick up any person or vehicle within the required range without being triggered by noise factors: animals, blown objects, weather changes, etc. (and it would be advantageous if it could distinguish authorized persons from strangers). Problems of the selectivity/sensitivity tradeoff might be eased by careful selection of the positions and fields-of-observation for detectors, so that an alarm is more likely to be caused by an intruder, either because of multiple detection or because the field-of-observation is unlikely to be affected by noise factors.

The marking techniques desired for curfew identification have apparently not received a great amount of attention as yet. There are numerous suggestions for marking crowd participants (see Problem B.3), but the emphasis for curfews seems to be on ID cards, which unfortunately can be lost, stolen, transferred, and to some extent forged. The familiar marking technique of stamping people with ultraviolet-sensitive ink also suffers from being relatively easy to copy. Perhaps laser-related technology may in the future permit development of marking using ink which is visible only under narrow-band illumination at specific wavelengths. Another possibility, already under development, is the use of unique and constant anthropometric characteristics to identify authorized personnel.

g. Hand-Geometry Identification: Devices developed by the Identimation Corp. identify individuals on the basis of finger lengths. Optical scanning of finger lengths can be used to create ID cards and to check identification against these cards or against remote records. Hand geometry is relatively invariable, and equipment can obtain 99% accuracy in accepting identification with a low rate of initial rejection of authorized personnel.

Devices for low-light surveillance have been discussed with regard to sniper detection (Problem B.1), and lighting equipment is considered under Illumination (Problem A.3). Radio equipment for communication among patrols and checkpoints is discussed under the general heading of Communications Requirements Among Control Forces (Problem C.4), since the special communications requirement for improved curfew enforcement (Criterion b) is mainly concerned with the kinds of information shared.

Since curfew enforcement appears to require a combination of human surveillance and mechanical aids, the question arises, how can the best feasible combination be determined? The goal should be a system which can permit effective response to any traffic in the curfew area (Criterion a). However, can this be accomplished best by establishing numerous manned checkpoints, with mechanical sensors only in a few strategic locations; or should the plan be to use numerous detector devices and to use mobile units to respond to multiple signals? These are only two of a variety of possible plans, and evaluating the plans calls for some investigation. The investigation would take into account such factors as population and street densities in the curfew area; numbers of control forces; probable levels of communication among checkpoints and patrols (how easily can information be shared among all?); selectivity of detector equipment; numbers of persons authorized to move across curfew lines; and concentrations of targets (economic or ideological) for curfew violators. Analysis of these para-

meters and others should enable the development of standards which can be applied in establishing curfew enforcement in specific communities.

5. Apprehending and Detaining Citizens

Problem: Many military tasks during civil disturbances (guarding barriers, clearing buildings, stopping hit-and-run violence, controlling crowds) are likely to require troops to apprehend and detain citizens. Military personnel often perform this duty with some reluctance, because it is more a police mission than a military one and because soldiers are often inexperienced in arrest procedures. Furthermore, apprehending and detaining people can complicate military operations. Scarce manpower may have to be used for guarding prisoners. Persons detained may provoke further violence by attracting disorderly sympathizers or by attempting to escape. Finding a place to detain people and transporting them there may be difficult. Finally, the unfamiliar and time-consuming process may be futile if troops have not gathered and retained enough substantiating evidence.

Criteria for Solution: Reducing the problems of apprehending and detaining citizens depends above all on close cooperation between military and civil authorities. Troops can also benefit from improved equipment and techniques for handling detainees. The task in general can be made less difficult by:

a. Insuring the presence of police to take part in the apprehension and detention of citizens. FM 19-15 makes this a policy "whenever possible"; the objective should be to make it possible at all times. The police have the training and legal authority for carrying out arrest procedures, and they are particularly experienced in dealing with evidence and the legal rights of arrestees.

b. Preplanning and coordination with police to establish consistent procedures for apprehension and detention. These procedures should permit more efficient use of manpower and should help soldiers keep their actions in accordance with legal doctrine. Such procedures should be incorporated into training programs whenever possible.

c. Using non-lethal means to immobilize, subdue, and/or isolate offenders. Troops should have some means to discourage escape or attack other than the threat of killing (which is often disbelieved). Hardware and tactics should operate with the precision and scale necessary to achieve only the desired restraining effects. It is worth noting that some types of non-lethal weaponry (such as CS dispensers) may be effective in halting a violent incident but may not serve to immobilize the participants.

d. Using techniques to keep detainees restrained and immobilized near the scene of a riot until removal is possible. Such techniques should conserve time and manpower for the military operations, and the increased efficiency of these operations would permit a speedier removal of the detainees to proper detention facilities.

e. Removing detainees from the riot area as quickly as possible. Quick removal minimizes the problems which detainees or their supporters can create for

troops trying to restore order. It also allows for faster legal processing of detainees. The methods of removal should minimize manpower requirements, should minimize the risk of injury to detainees (including self-inflicted injury), and should be able to resist attack from within the carrier and from without.

f. Quickly providing each detainee with relatively indestructible and informative identification. Besides speeding up legal processing, this will aid military forces in organizing whatever records and evidence are needed from them, and will help to prevent offenders from exploiting confusion about their identification or the reasons for their arrest. While identification should be easy to remove (for instance, when a detainee is released), it should be designed and used in ways to discourage removal, damage, or transfer by detainees themselves.

g. Maintaining a time-marked record of each apprehension. Such a record should allow clear identification of the individual involved, the reasons for apprehending him, and the time of arrest. The record should require a minimum of time and equipment to make, should be relatively secure against tampering, should be relatively unaffected by the environment, and should permit long storage with minimal maintenance. The present policy in the USCONARC Civil Disturbance Plan, calling for a Polaroid photograph of each detainee as soon as possible after apprehension, is a partial response to this criterion.

h. Preplanning the transfer of detainees and evidence to civil authorities or detention facilities to insure the most rapid and efficient processing and care for detainees. Military forces should transfer detainees so as to minimize any administrative crises or community grievances which might add to problems of restoring order.

i. Streamlining procedures whereby civilian authorities can request and obtain military assistance in establishing and operating detention facilities. As a safeguard against any charges of excessive military intervention, present doctrine requires that any proposal to set up military detention facilities be cleared through the Department of the Army and the Department of Justice. However, under the stresses of a civil disturbance, local agencies may lack the personnel and equipment to maintain adequate detention centers. Because there is the real possibility of a need for immediate military assistance in handling prisoners, procedures for granting this assistance should be made as simple and straightforward as national policy will allow. Present doctrine insures that military personnel who assist with detention will be selected from those specifically trained in confinement operations.

Potential Solutions: There is a variety of concepts which may prove useful in dealing with four aspects of apprehending and detaining citizens: restraining individuals, transporting persons to detention centers, constructing temporary detention facilities, and preserving identification and evidence. Several concepts concerned with the task of restraining captives are as follows:

a. Thermocapture: This concept involves the use of thermosetting plastic, sprayed by hose or splattered by canister on the ar-

restee. The plastic would begin to set, making movement by the arrestee increasingly difficult.

b. Instant Cocoon: A plastic spray is available which sets quickly to form a tough, pliable membrane. Such a spray could be used to immobilize rioters, and if necessary, to encapsulate them from the neck down.

c. Interlacing Net: One method proposed at LNL for temporarily incapacitating a group of rioters would be to project a filamentary net over their heads. This net would be composed of many single lines which would be simultaneously fired from two vehicles spaced so that the lines interlace.

d. Nets: Nets have been used by police in other countries to control disorderly individuals. Many types of nets are available. Techniques could be quickly worked out for delivery by hand or from the air.

e. Vehicle Handcuffing: Devices could be built onto vehicles for detaining a large number of people. For example, rigid handles welded to the frame over car doors could permit handcuffing of up to eight persons. As an alternative, portholes could be cut in the side of a car, and prisoners' hands could be inserted in these and clamped on the inside of the vehicle.

f. "Flex Cuff" Nylon Handcuffs: A nylon restraining tie has been developed by Kent Corp. for use in binding ankles or wrists. The tie is a 22-inch-long nylon plastic strap with a slotted head at one end and a tapered tail at the other. After the strap is looped around a prisoner, the tapered end is inserted in the slot and pulled tight. A steel barb in the head locks the strap so that it can be removed only by cutting.

These devices answer Criterion c by being non-lethal and permitting immobilization. They also relate to Criterion d by permitting restraint of individuals at the scene of an incident with only limited guarding required.

However, there is still the task of removing immobilized detainees from the scene of rioting before they can act in concert against control force personnel and before friends can actively interfere. To prepare vehicles for transporting prisoners, civil disturbance forces may want to make use of the vehicle-hardening kit evaluated by USCONARC. Other possibilities are:

g. Prisoner Restrainer: This is a concept for a kit to adapt vehicles for prisoner detention. It includes a sprinkler system and stiff metal screening to prevent damage by kicking.

h. Riot Control Wagon: (See above, item (6), page 11).

Although it may not be difficult to adapt vehicles for carrying prisoners, there is a question of how to obtain enough vehicles to transport the large numbers of persons who may be apprehended in a major disturbance. If the supply of vehicles is limited but it is imperative to remove people from the scene of rioting, a partial solution might be to run shuttles to temporary detention sites close by. If it appears worthwhile to construct temporary detention facilities, the construction may rely on rapidly-erected barriers, for example:

i. General-Purpose Barbed Tape Obstacle: Developed in connection with a QMDO for a controlled barrier system, this coiled tape, packed in a polyurethane foam container, can be extended to form a barrier 76 feet long and 30 inches high. Tests indicate that it is ten times as effective as concertina wire, requires only 3/100 the emplacement effort, weighs approximately 1/4 as much, and takes up less than 5/8 the shipping volume. A vehicular emplacement capability has been developed which will permit simultaneous, multiple-strand use.

j. Instant Jungle: (See above, item m, page 25).

The concept of a portable stockade might also be of value:

k. Portable Prisoner Stockade: The stockade consists of portable stanchions and high-voltage, low-power electrical wire. The walls of the stockade would be about 6-7 feet high.

The most efficient system for apprehending and detaining rioters may be of little value without adequate ways to preserve evidence and identification. Present civil disturbance planning calls for the use of Polaroid photographs, identifying wrist bands or clothing tags, and detainee turnover cards. Local officials will probably supplement the collection of evidence and maintenance of records. However, for more complete and more tamperproof records, the following devices may be of value.

l. Polaroid Identification Card System: The system is composed of a Polaroid 926 Land Camera, a 930 Card Laminator, a 932 Die Cutter, a 936 Developer Timer, and a 936 Pouch Sealer. The camera simultaneously photographs the person and his data card. The finished ID card can be completed in two minutes. The card is tamperproof because the plastic lamination destroys the card if it is removed.

m. Stereometric Cameras: (See above, item sss, page 44).

n. Miniature Concealed Camera: (See above, item ttt, page 44).

o. Video Rover Recorder: (See above, item ppp, page 44).

p. Porta-Pack TV Recorder: (See above, item qqq, page 44).

q. Audio Tape Recorder: (See above, item vvv, page 44).

r. Communications Logger: (See above, item www, page 44).

s. Streamlined Arrest Forms: This concept for an improved arrest form would make maximum use of preprinted information and coding schemes. The format should permit photographing the form and the arrestee together. The form should provide cross-references to other records.

Technical improvements may make it easier to apprehend and detain people. However, the value of apprehension and detention in civil disturbances has not been fully studied. In particular, there is a need to thoroughly examine the strategy of mass arrest. Mass arrest may occur in two ways: immediate apprehending of large numbers of people in a crowd incident, or the aggregate result over time of many small-scale arrests made throughout a wide area (as in curfew enforcement). In either case, the strategy not only halts disorderly activity, but also reduces the numbers of people requiring surveillance in the riot area, and at least interrupts the active participation of arrestees in the disturbance. However, mass arrests are costly: they make demands on manpower and equipment, they slow down control operations (once an incident has been stopped), and they tax the limited resources of detention facilities and the legal system. Furthermore, the extent to which mass arrests discourage riot participation, reduce violence, and affect public cooperation with authorities is not fully known. What is needed is an analysis which takes into account not only the impact of mass arrests in general, but also the consequences of particular features of apprehension and detention, from restraint of prisoners through legal processing to the operation of detention centers.

C. CONTROL OF INFORMATION

To restore order in a civil disturbance, military forces must not only help to control the physical environment and the actions of the populace, but must also help to organize the flow of information concerning the disturbance. There is a need to obtain, transmit, and make use of a multitude of facts during a disturbance. Neither the control forces nor the public should ever have to rely heavily on rumors and hearsay. It should be easy to share information throughout the military organization and across boundaries with police, local officials, and the public. Troops and citizens should be able to gain a better understanding of each other's situation. While these goals have been known and stated for a long time, they are still difficult to achieve. Important improvements can be made in obtaining information, communicating it, and reaching the right audiences.

1. Obtaining Intelligence

Problem: Military control forces attempting to control or quell civil uprisings may well suffer from a shortage of accurate pre-operational intelligence. Probable causes include a lack of manpower for gathering intelligence, a fail-

ure to fully exploit information available from civilians and small-unit patrols, and a limited capability to verify unsubstantiated reports.

Criteria for Solution: Production and use of intelligence for civil disturbance operations can be improved by:

a. Establishing procedures for interagency coordination of intelligence collection, evaluation, and dissemination state-wide. Better integration of the intelligence effort among civil agencies throughout a state could lead to greater economy in collection and more efficient filtering out of false information. National Guard units have a clear need to have access to intelligence about events state-wide. Furthermore, while the military role in intelligence collection is sharply restricted in keeping with national policy, military units should be prepared to make an active contribution to the intelligence network after they have been called in to assist in a disturbance. Although interagency intelligence coordination must be civilian-sponsored, it should receive active military support in the course of state civil disturbance planning.

b. Making a member of each unit separately engaged in control operations responsible for the collection, verification, and transmission of facts about the operations and any incidents encountered. The explicit assignment of this responsibility will guard against loss of information or transmission of erroneous reports.

c. Increasing the capability for remote surveillance of the riot area and surrounding neighborhoods. The objective is to increase the chances of detecting preparatory or early stages of violence without causing greater dangers of attacks on military personnel and without aggravating community tensions (e.g., through the suspected presence of undercover agents). Use of remote surveillance devices can aid control operations and patrolling without encroaching on the investigative authority of civilian agencies.

d. Offering a publicized way for citizens to channel information to control forces without risk of intelligence to themselves. The use of such information must be coordinated with local civil authorities, but the information should be handled so that the informant does not have to worry about dealing with police or other local officials later on.

e. Increasing the use of recording devices for preserving intelligence inputs. It is desirable to have such devices in use with individual troop units; they should therefore be portable and easily concealed. Besides offering a more complete record than written notes or memory, recordings augmented with the collector's evaluation can enable written reports to be compiled outside the area of control operations.

f. Using techniques to detect and locate citizen transmissions which aid hostile activity and/or violate communications regulations. Although monitoring of private transmissions may be the primary responsibility of other agencies, military control forces in their own interest should cooperate with these agencies and should supplement their detection effort during civil disorders.

Potential Solutions: Many of the technical aids to surveillance and recording identified for use in controlling citizens (Problems B.1-5) may be relevant to the task of obtaining intelligence. The unique requirements of the task in US civil disturbances are still largely unexplored. For example, what are the most efficient methods by which citizens can volunteer information? Would the convenience of a "hot-line" arrangement be offset by the opportunities for dissidents to overload the lines or to provide enough false information to obscure the valuable inputs? Would it be desirable to have a warning or communications system for immediate use (when there is no chance to get to a telephone), or would it be desirable to concentrate on long-range, slow-reaction information inputs (thereby making it easier to filter out false reports)? Decisions on these questions will have to make use of experience in other contexts (day-to-day police operations, foreign urban insurgency) and possibly simulations.

Questions about obtaining citizen reports are part of a larger issue of how to operate an efficient intelligence system in the midst of a civil disturbance. There is a need to analyze how much intelligence is gathered, how well it is verified, and how efficiently it is shared as a result of several possible intelligence systems involving civil-military cooperation. A study of these three important features of processing intelligence would take into account who provides information, who receives it initially, how the information travels from the initial receiver, and how the various recipients respond. It would be important to determine whether different systems are desirable for different kinds of intelligence (for instance, concerning incidents, individual rioters, or general patterns of violence). The systems study called for might deal with numerous specific questions: for example, what are the effects of relying heavily on police for intelligence on incidents, injuries, personal identifications, and property damage?; in what ways can military units provide greatest assistance in verifying reports?; and how can intelligence be channeled most quickly through existing multi-purpose communications networks? The results of the study would hopefully relate all the criteria to Criterion a, outlining a method for integrating the multi-agency effort to obtain intelligence.

2. Identification of Riot Participants

Problem: There is a recognized need to identify citizens in a civil disturbance, as a way to deny crowd members the protection of anonymity and as a part of curfew enforcement and apprehension and detention procedures. Good solutions must remove the anonymity of most rioters (including those who avoid confronting troops); prevent individuals who commit violence in one place from showing up unrecognized in another; and provide enough evidence to make an individual vulnerable in court, thus reducing rioters' feelings of immunity.

Criteria for Solution: National Guard leaders have called for an identification system which will record rioters in action in a way that permits easy dissemination and that provides conclusive legal evidence. The methods employed in such a system should:

a. Provide legally-acceptable evidence that an individual was engaged in unlawful activity at a particular place and time.

b. Permit remote-controlled or automatic recording. This capability is essential for dealing with purposeful rioters who take care to avoid contact with control forces.

c. Maximize portability, resistance to damage, and ability to obtain identification at a distance from a disorderly incident. The means of identification should be able to go where the action is without becoming a vulnerable target of the action. Long-range operation is also a countermeasure against the ability of rioters to flee from troops.

d. Permit conspicuous operation and/or publicizing of results. This may discourage riotous acts before they occur.

e. Make disguise or evasion difficult. Enough information should be recorded so that any spontaneous attempt to cover up or disguise oneself will be inadequate. Automatic or remote-controlled equipment should be set up to minimize the chances for persons to pass through the surveillance zone without being identified.

f. Allow widespread alerting of control forces to watch for individuals identified in unlawful activity. This will require identification records that can be rapidly transmitted and shared. Police experience with these requirements may be of value to military forces.

g. Use equipment and records which are difficult to tamper with or duplicate. Destruction of evidence is not the only threat. Rioters may take countermeasures by contributing forged records or evidence to mislead and confuse control efforts. Control forces may also have to convince courts and the public that the records have not been doctored.

h. Limit access to records to official agencies, following strict regulations. Restricting access will not only protect against misuse of records but will also prevent extremists from using them as a source of free publicity, such as through the news media. Participants in a disturbance should know that their identification can only be used against them, and can only be used through legal procedures.

Potential Solutions: A number of surveillance, identification, and recording devices have been discussed in connection with halting sniping, controlling crowds, and apprehending and detaining citizens (Problems B.1,3,§5). It should suffice here to point out a few characteristics of these devices which are important for providing evidence of illegal activity.

A basic requirement is to have evidence of action. There is accordingly an advantage in having motion pictures or video tapes from which still photographs can be obtained as needed. It is appropriate that Federal civil disturbance forces are authorized the use of movie cameras in addition to Polaroid cameras, but the possible value of closed-circuit television and video recorders should also be considered. The need to have cameras which can operate automatically or by remote control should also be taken into account. Another important characteristic to be emphasized is the ability of camera equipment to obtain sharply-defined pictures at long ranges despite poor lighting conditions (for instance, streetlighting).

Visual evidence of riot participation may need to be supplemented. Additional data gathered at the scene of disorder might include recordings suitable for voice-print identification. Verbal information is normally added at the time of apprehension. However, it might be of value to be able to put evidence of several modes (including verbal statements) into a single recording package immediately following an incident, if the contents of the package could be made sufficiently precise and tamperproof to hold up in court. Such a combined record might permit rapid transmission and use prior to apprehension, with additional information to be obtained after an individual is in the hands of civil authorities. All these possibilities require further study.

Mechanical aids by themselves will not disclose the best tactics for their use. Organizing an identification system calls for systems studies; this can be illustrated for two specific problems. First, the distribution of remote-controlled or automatic recorders will have to be more selective than the use of intrusion detectors, particularly if the specific objective is to obtain evidence of unlawful activity. A systems study could help to determine at which locations it is most essential to have equipment present for identifying unauthorized persons; what movements at which points will be indicative of illegal behavior to come, and so should start the recording process; and how devices should be positioned so that a minimum of equipment will insure an accurate identification from each record, despite any attempt of a lawbreaker to conceal himself. A second problem for study is how to most effectively alert control forces to the identities of known rioters. Part of the problem is to find out how much identifying information must be broadcast to produce results. Another part involves weighing the advantages of sending information in advance to patrols or guards who are likely to encounter a rioter, vs. having units check on individuals as they confront them. The test of different alerting procedures is how quickly and consistently an initial identification of a rioter leads to his apprehension. Both the study of alerting procedures and the study of automatic recording can make use of data from day-to-day police and security operations, since the civil disturbance problems are basically everyday concerns magnified in numbers and scale.

3. Civil Disturbance Indicators

Problem: Public officials and control forces need ways to accurately estimate the severity of disturbances and the success of control efforts. Measurements of disorder and control could provide a basis for rapidly evaluating strategy, accurately mapping disorderly activity, and deciding when troops should be called in or sent home. Uncertainty about the severity of disorder was at least part of the cause for delay of troop deployment in Los Angeles (1965), Detroit (1967), and Washington (1968), and it probably helped to delay the withdrawal of National Guard patrols from Wilmington, Delaware (1968-1969). Uncertainty about the effectiveness of control efforts has led to controversy and contradictory strategies affecting the use of force (Detroit, 1967) and the deployment of control forces (Cleveland, 1968).

Criteria for Solution: There is a need to develop a set of indicators which are consistently and meaningfully related to the histories of recent disturbances from initial outbreak to the re-establishment of order. The indicators selected should:

a. Be based primarily on general features of disturbances, independent of local variations in setting or participants. Each disturbance will have some unique characteristics which must be evaluated by the field commander on the spot. However, his task of estimating the situation will be simplified if he can interpret more common facts quickly and authoritatively because their meaning has been consistent across a wide range of past disorders.

b. Refer to the full range of control problems and responsibilities. It is possible that military action against one problem can intensify others; for instance, keeping people off the streets can create problems of employment and food supply. Therefore, it is important to be able to detect how the efforts of one type of control operation affect other events.

c. Be immediately available and permit continual updating. The importance of the indicators is that they can help men in command judge from moment-to-moment how a disturbance is progressing.

d. Permit comparison of values for the indicators during a disturbance with values for time periods preceding the disturbance. Knowing a number may not be as important as knowing how much this number departs from a norm and how it is changing. For example, in a city averaging three major fires a day before a disturbance, a drop in the daily number of fires during the disturbance from twenty to ten may not mean as much as it would appear to out of context.

e. Require a minimum of effort for data collection and reporting.

f. Require a minimum of effort for combining, organizing, and interpreting data.

Potential Solutions: Developing a set of civil disturbance indicators will require research. However, the argument may arise that this research is unlikely to produce useful results for two reasons: because civil disturbances are too complex to be measured by a few indicators, and because any indicators discovered will quickly become obsolete.

It would be impractical to measure every feature of a civil disturbance, but this is not the goal of the proposed research. Indicators would be selected because of their relevance to the particular objectives of military assistance and the results of particular control operations. For instance, it would be desirable to have a ready estimate of how severe the problem of sniping is and how well troops are counteracting it. As a more general example, it would be important to keep track of the numbers and severity of violent incidents in an accurate and meaningful way. Using indicators for limited purposes like these is what a field commander must implicitly do in any case, although in past civil disturbances commanders have had to make judgments on an ad hoc basis or with the help of a limited range of personal experience. All the research would try to accomplish would be to remove a few of the uncertainties and needs for subjective guessing which make evaluation of some control efforts difficult in the midst of a civil disturbance.

Because the character of civil unrest has changed so markedly in the past few years, and because further changes seem likely, the relevance of past experience to future problems may be limited. However, there is no basis for saying that everything which has happened in past disturbances will be irrelevant and unimportant in future civil disorder. In fact, finding a few consistent measures of public behavior and responses to control effort for a wide variety of civil disorders may be unusually important, because these indicators are most likely to remain valid in the future and are therefore the most reliable information on which a commander can base his strategy and tactics. For example, if the demands on military patrols are always related closely to the geographic distribution of reports of violent incidents, a measure of this distribution will be important to military planning. Furthermore, indicators will need to be measured repeatedly during a disturbance, because the military commander is trying to change their values through control operations. If the relation between a control method (e.g., mobile patrolling) and an indicator of its desired effect (e.g., reduction in numbers of violent incidents) should differ from past experience, the commander will be quickly aware of this and can begin making appropriate adjustments.

The potential usefulness of indicators is clear; the research methods for finding them must be decided. Two suggestions about the research can be offerred here. First, the indicators should be based as much as possible on detailed and quantifiable information about events in the civil disturbance area. Both the Office of the Chief of Military History and the Research Analysis Corporation have indicated that such information may be available in official archives and records. It would be particularly important to discover indicators based on records which are maintained before and after disturbances.

A second suggestion is that any important feature of a civil disturbance is likely to be complex, and therefore will not be measured adequately by a single indicator. Furthermore, reliance on a single indicator may be risky because records of that indicator may be incomplete or unavailable for a given disturbance. Therefore, the best policy will be to develop multiple indicators for any important features of civil disturbance control. For example, measuring the reduction in injuries and bloodshed during a disturbance might be based on data such as hospital admissions, ambulance calls, etc. Determining the best combination of indicators, in terms of their interrelations and how well they cover an important characteristic of civil disturbance control, is a task suitable for systems analysis. Therefore, a systems study with access to Federal and local archives appears to be the proper approach to developing a set of civil disturbance indicators.

4. Communications Requirements Among Control Forces

Problem: A not uncommon problem encountered by National Guard personnel concern the breakdown of communications in civil disturbances. The problem in past disturbances has been threefold; Guard units have gone on duty with too few radios; they have been unable to make their radios perform well in built-up areas; and even radios that operated well have often been unable to link up effectively with police networks. While pre-positioning of more reliable equipment is easing the problem somewhat, many difficulties persist. Short-

ages of radios below the company-command level hamper the use of smaller military units in operations* and delay the transmittal of messages between headquarters and troops. Unfamiliarity and poor condition of prepositioned equipment has at times reduced its value to National Guard units. Finally, limited compatability of Guard and police equipment, coupled with a police tendency to overestimate the capabilities of Guard radios,** has adversely affected police-military communications. In addition to these problems already experienced, there is the threat of future attempts by hostile groups to interfere with communications among control forces.

Criteria for Solution: The general solution to the communications problems of civil disturbance troops will be to expand their equipment and techniques for communicating. An improved communications system should feature:

a. Radio equipment capable of reliable transmission and reception throughout urban areas and requiring a minimum of adjustment and operator experience. This equipment should be able to overcome both the propagation and radio frequency interference of the urban area. To the extent that newer-model radios satisfy this criterion, more of these should be made available, even if this is only possible in pre-positioned stockpiles.

b. Issuing of advanced radio equipment to National Guard units so as to reduce their dependence on stockpiles. Recent experience has indicated that some portion of the radios requested from stockpiles will arrive in inoperative condition, a fact which reduces the value of pre-positioned stockpiling and which might possibly be avoided if the radios received the more frequent testing and checking which would result from their regular use in training. Ready access to the radios and increased familiarization with them would also improve the chances that troops would operate an effective communications system, even if they were relatively inexperienced, or if units had to be activated very suddenly, or if there were difficulties in transporting equipment from the stockpiles.

c. Issuing of more receivers and transceivers to small units; in some cases, providing for communication at the individual level. By increasing the communications capability in this way, military forces can conduct more flexible and economical operations by greater reliance on small units, and can reduce the confusion which has often resulted from dispersal and the failure of voice communications in the urban setting.

d. Personal communications equipment which is lightweight, has a range adequate for the area of operations, and requires minimal use of the soldier's hands.

e. Availability of two-way radio communications for all tactical vehicles. This is within the capability of authorized equipment for Federal civil disturbance troops (as indicated in Problem A.2); the task is to insure that the authorizations are filled and that National Guard civil disturbance units are comparably equipped.

*,**Conclusions of Arnold Sagalyn, ADL, based on discussions with National Guard personnel and with police.

f. Broader utilization of air-to-ground communications where aircraft are available for troop support. Both doctrine and equipment support the use of air-to-ground communications networks, but these networks have not always been fully exploited in US civil disturbances. Aircraft can not only provide surveillance in coordination with operations on the ground, but can also serve as communications centers or relay stations for troop units on the ground which otherwise would have difficulty maintaining direct contact.

g. Specific channels for rapid exchange of messages between military units and police. Such channels would be established by special routing procedures, possibly using selected frequencies or equipment. Rapid intercommunication is important for local assistance and coordination of operations. However, there must be ways to filter and direct messages so that only essential information and audiences are involved.

h. Protection against interference or misuse by hostile groups. It is desirable to guard against three types of hazard: that rioters may prevent communications from the scene of violence; that rioters may jam or overload communications channels; and that rioters may monitor military communications to their own benefit.

i. Effective use of assistance from commercial communications organizations. This assistance should go beyond the familiar requirements for connections with the outside world to include help with local problems. For instance, there may be needs for protected auxiliary channels for local control force communications (e.g., telephone circuits to use if radios fail), and possible needs for specialized commercial equipment and know-how to supplement military capabilities (e.g., in obtaining and transmitting video recordings).

Potential Solutions: In the case of Federal civil disturbance troops, the US CONARC Civil Disturbance Plan provides for rapid communications with higher headquarters and authorizes supplying units with advanced-model VRC and PRC radios. However, the adequacy of the planned distribution of radios, of the actual distribution, and of the communications system below the task-force level needs further review. In the case of the National Guard, which has a recognized shortage of equipment, there is a need to study not only the questions of adequate planning but also the problems of how best to upgrade the Guard communications capability and how to arrive at the best balance between distributed and stockpiled equipment.

One example of a particular communications problem which should be investigated is the method for establishing communications between different control agencies at the local level. Present policy apparently emphasizes maintaining separate radio networks for each agency (such as the military command and the local police) but locating headquarters together, so that messages can be exchanged between agencies at headquarters. Although collocating headquarters may have many desirable features for coordinating plans and policies, it is not clear that this arrangement alone is sufficient to handle the interagency communications requirements indicated in Criterion g. The USCONARC Civil Disturbance Plan mentions the possibility of using commercial telephone lines or exchanging personnel and equipment between agencies; specialized use of radio networks should also be considered. A thorough analysis of possible interagency

communications systems would take into account features such as message sources, intended message recipients, message content, number of messages, number of channels available for sending and for receiving messages, required authority for responding to messages of different types, required speed of response, and the number of other parties that need to keep informed about a given type of message response or control effort. Evaluation of standard procedures and alternative arrangements would look for ways to minimize delays and breakdowns in message transmission, frequency and duration of overloads, delays in response to messages, probabilities of receiving conflicting messages through different channels, and uncertainty about the locations and actions of units asking for assistance.

It is possible that the solution for Criterion g can be based on standard multi-purpose equipment supplied or available to military units. Other criteria, however, may call for more specialized hardware. There are a number of concepts available which might specifically contribute to flexibility (Criteria a, c-f) and security (Criterion h) of communications.

More flexible radio communications would permit use by more men, in a wider range of environments, with easier extension or restriction of networks. There are several devices which might help meet these qualifications. For communications down to the level of the individual soldier, available items include:

a. Wristwatch Transmitter: There are devices available commercially which incorporate a sensitive microphone and transmitter in a wristwatch housing. Such a device broadcasts up to 200 feet and can be used with an FM receiver.

b. Remote Calling Devices: Lafayette Radio and Electronics manufactures a Pocket Pager, which is a remote receiving device used by doctors, salesmen, etc. The Pocket Pager operates on any of 23 possible channels in the 27 Mhz frequency range, and has a 0.7 microvolt sensitivity. Hallicrafters manufactures a number of similar devices, the CRD-100 Series, designed to operate in the frequency ranges of 27-50 Mhz, 108-135 Mhz, and 144-174 Mhz.

c. Hand-Held Two-Way Radios: Several firms manufacture hand-held two-way radios. The GE Pocket Mate operates on police frequency bands and has a 1 watt output. The Motorola PREP is belt-mounted and operates on two frequencies in the 450 Mhz range with a 0.7 watt output; it is designed for use with "repeaters" to extend its effective transmission range. The Dyna-Com 6 produced by Lafayette Radio and Electronics transmits with 5 watts of power on six channels in the Citizens' Band. The Motorola HT Series of environmentally-ruggedized FM radios broadcast at 25-52 Mhz with 1.4 watts; at 132-174 Mhz with 2.9 watts; and at 450-470 Mhz with 0.7 watts. The HT Series have 0.5 microvolt receiver sensitivity. The RCA Personal Fone radio has 0.5 microvolt receiver sensitivity also and broadcasts in five channels in either the 30-50 Mhz or the 132-174 Mhz band, with 2.2 watts output. The Personal Fone has plug-in modular construction for ease of maintenance.

For small or dispersed units, these devices might possibly allow closer and more convenient communications than the present employment of VRC and PRC radios will, but there is also the possibility of supplying civil disturbance troops with the PRR-9 + PRT-4 helmet radio system. Before any miniaturized system is recommended, the merits and drawbacks of one-way vs. two-way communications would need to be studied and weighed.

The short ranges of some miniature radios would not necessarily be a disadvantage. For the most part, short transmission range would help keep small-unit communications from being entangled in larger networks, and it would make dissident surveillance of small-unit operations more difficult. A message which had to reach another unit or headquarters could either be routed through conventional equipment or could be relayed by techniques such as the following:

d. Hard-Wire Relay Terminal: An automatic two-way radio, set up to extend the range of hand-carried, short-range transmitters, would receive signals from these transmitters and would automatically retransmit the signals to a control center, using hard-wire (telephone) lines. A number of such units would have to be emplaced in trouble areas prior to riots.

e. Radio-Relay Transceivers: These transceivers would operate similarly to the hard-wire relay terminals, but would retransmit messages at higher power levels by radio rather than by wire. Military devices of this type have been developed.

f. Heliborne Headquarters: A heliborne command and control center would provide the anti-riot commander with communications to the elements of his command, plus displays of the overall situation and the opportunity to observe directly sectors requiring special attention.

Making radio communications easier and more versatile depends in part on increasing the ability to broadcast under adverse conditions. One relevant type of improvement would be the development of better microphone equipment. Two examples are cited as illustrations:

g. High-Ambient-Noise-Level Communications: Mouth-held, low-mass plastic tubes would carry speech to a microphone contained in an accompanying plastic helmet. The tubes would act to shield the microphone from ambient noise. The concept is that used by plane handlers on Navy aircraft carriers. The Navy device contains a radio transmitter in the helmet, with an output of less than 1 watt.

h. Gas Mask Microphone: A bone-conduction microphone compatible with gas masks would permit voice communications by radio and over public-address systems.

Besides offering greater reliability of clear transmission, devices like these have the advantage of leaving both hands free.

The ability to send messages or signals without the use of the hands would be an important asset against one of the principle threats to communications security: the situation in which the communicator or his equipment is in immediate danger of attack. For some missions involving small numbers of troops, it might be desirable to have communications devices which require no interruption of control actions, which are difficult to physically interfere with, and which can be used covertly if necessary. Two examples of devices developed originally for the specialized needs of undercover agents are:

i. Mouth-Held Transmitter: A small mouth-held transmitter would permit surreptitious use. Such devices are advertised by suppliers of equipment for clandestine uses.

j. Code Transmitter: Litton Industries has developed a digital low-data-rate transmitter for distress or identification codes. The miniature size makes it suitable for undercover use.

Development of such emergency equipment would have to resolve questions about how much information needs to be transmitted. Some emergencies may warrant detailed messages; on the other hand, verbal communication may often be impractical, and even code transmission can be interrupted or garbled.

A second problem of communication security is to prevent the more deliberate rioters from overhearing useful information about control operations. Systems to protect against unwanted audiences include the following:

k. Radio Scrambler: The Privacom Radio Scrambler, manufactured by MEICO, Inc., provides communications security by use of voice frequency inversion. Signals sent and received use separate inversion frequencies which may be changed easily. The inversion is accomplished by a small transistorized unit that can be attached to any radio station.

l. Transmitter-Modulation Scrambling: Pseudo-noise (bi-phase and frequency-hopping modulation techniques) can scramble transmission to prevent monitoring by rioters. A low-cost modification kit has been developed by ITT to convert sets like the AN/VRC-9 and AN/VRC-10 to frequency-hopping units by incorporating spread-spectrum modulation. The scrambling principle is generally adaptable to existing FM radio systems.

Rioters may not merely listen to official broadcasts; they may also attempt to insert their own messages to create confusion and overloads in official communications. This possibility is particularly threatening since there are simple, low-risk ways to gain access to some communications channels (e.g., by telephoning the police). One of the possible ways to protect against dissident communications is the following:

m. Interface Switchboard: This is a concept for the use of an interface telephone switchboard to prevent jamming of police communications networks during riots. The interface switchboard would handle incoming calls to police headquarters and

would route them on to an internal secondary switchboard or would perform in parallel with the second switchboard.

Underlying the discussion of interagency communications, personal radios, emergency communications, and message security is the question of how much information of what kinds needs to be transmitted within the military command and between local control agencies. Possibly it is desirable to have versatile communications equipment and channels capable of transmitting more than one form of information. One example of such equipment would be radio-based printers:

n. Teleprinters. The Telescripter teleprinter developed by SCM Kleinschmidt is designed to operate with radio or wire communications sets, to provide printed messages for command and control use which have a higher level of security than voice communications. The Telescripter prints 75 words per minute and produces an original document and three copies on fan-folded paper. The device operates on 12 volts and 25 watts of power, and it permits unattended operation.

o. Automatic Printer: The Ferranti Electric Automatic Printer uses a punched, paper-tape message created by a mobile receiver from radio transmissions. The output is noiseless strip printing at a speed of 300 to 400 words per minute. The printing technique apparently allows the transmission of alphabetic and pictorial information. The system is secure and permits unattended operation. The Ferranti printer operates on 12 volts and 1.2 amperes, uses a radio bandwith of 3 khz, and permits selective calling of up to 800 individual addresses.

Another possible example would be radio-to-computer links for aid in identification and in recording and classifying spot reports.

However, communications planning seems to have concentrated on how to get messages from a sender to a receiver, with little attention devoted to the information the messages are supposed to carry. Although a military unit may have standard procedures defining the appropriate messages to send by specific channels, there appears to have been no systematic review of message contents, actual and required, during civil disturbances. An analysis of message contents could provide guidance for distributing one-way and two-way communications equipment; for distributing devices with only a code signal capability (no voice pick-up); and for allocating access to verbal communications channels (by controlling the availability of equipment and/or frequencies). Such an analysis might point out desirable ways to reduce competition for transmission frequencies and to keep information flows within usable levels. A study of messages in civil disturbance control operations would possibly be a useful starting point for efforts to improve communications in civil disturbances.

5. Informing the Public

Problem: Civil disturbance control operations may become more difficult if there is insufficient effort to inform the public about military activities

and to correct unofficial reports. When facts are unclear or are kept secret, a common public solution to ignorance is rumors*. Several past disturbances, such as in Los Angeles (1965), Newark (1967), and Louisville (1968), offer clear illustrations of how rumors have aroused frightened, hostile, disorderly reactions from citizens. Another way the public satisfies its desire for information is by relying on the news media, which often supplement what they gain from official briefings by monitoring military communications and by seeking to interview soldiers on duty. After-action reports indicate there have often been news stories, based on fragmentary information unconfirmed by official sources, which have created an exaggerated and distorted view of disturbances for the public. The problem of misrepresentation in the news media is demonstrated by the way some reports of sniping have been handled**. Because of the difficulties which public rumors and inaccurate news reports can cause, the military effort to keep the public informed must include measures to counteract the errors in unofficial information.

Criteria for Solution: A military command participating in the control of a civil disturbance should:

a. Have the capability to directly inform the public about the nature of the civil disturbance and the measures being taken to bring it under control. This capability should be based on a combination of pre-arranged access to news media and use of public-address facilities. Any public announcement must be coordinated with local authorities. Possible contents of public announcements would include information on continuing dangers to citizens, temporary regulations and control measures, and relief operations. Being able to directly inform the public will enable the military commander to reduce communications delays, to overcome problems of selective exposure (e.g., people who do not read newspapers or who miss TV bulletins), and to have some control over what information is emphasized.

b. Assist in supporting and publicizing a rumor clinic in accordance with requirements of local authorities. A rumor clinic is a place where people can report rumors and can check their validity. The clinic, in response, can give facts to individuals and later to the public-at-large. Reducing the spread of false rumors can both remove stimuli for some riot behavior and increase the chances for a rational public response to control measures. Establishing a rumor clinic is a responsibility of local authorities, but military forces should actively provide such clinics with assistance and information (including rumors overheard by troops), for the sake of potential benefits to the military mission.

c. Minimize delays in providing newsmen with information about the civil disturbance situation and control operations (this criterion reflects a policy stated explicitly in the USCONARC Civil Disturbance Plan). Even partial in-

*For a discussion of the functions and evolution of rumors, see Improvised News by Tamotsu Shibutani, Bobbs-Merrill, 1966.

**A valuable critique of reports of sniping is "Sniping Incidents - a New Pattern of Violence?," published as Riot Data Review #3 by the Lemberg Center for the Study of Violence, Brandeis University, February 1969.

formation, if provided quickly, can squelch speculation and rumors and can establish the importance of the information office as a news source. Delays in releasing information will be filled by inventions and guesswork of the news media and the public, and the news eventually provided may not be taken at face value because of suspicions aroused by the delay.

d. Provide working accommodations for newsmen. National Guard units called to state civil disturbance duty may not be able to provide ideal accommodations, and even Federal task forces might lack adequate facilities at first. What is important is that news representatives should have some place where they can remain comfortably for some time to receive updated information and to file their stories. Providing at least this much will help to make the military information facilities a major news center during the disturbance.

Potential Solutions: Improvements in public information seem to require not so much new hardware and tactics but rather more effective use of civilian and military resources now available. Some improvements will be a simple matter of following present policy. However, one matter requiring more study is the type of information that will be given to the public at any time. For instance, how far in advance should troop withdrawal be announced to the public? How beneficial is it to inform the public about the effects of weapons and the policies for their use? How effectively can the military command present facts to rebut rumors? A study of public reception and reaction to statements from military sources, compared with the effects of statements by other authorities (including a comparison of completeness and accuracy of news coverage) might aid the organization of military information offices in civil disturbances.

6. Informing the Troops

Problem: The demands placed on troops in civil disturbances are highly unusual in comparison with most military training and combat experience. Therefore, troops need to be well-informed about the ways ordinary American citizens will behave in civil disturbances and about the ways that people will react to various control tactics. At present, such information must be stated in broad generalizations, supplemented by limited personnel experience and advice about extreme circumstances. There is also the difficult task of enabling troops to turn verbal knowledge into effective action in an actual riot situation. Even the best tactical training may not be able to adequately duplicate the violence and confusion which may surround a soldier when he must put his knowledge and briefings to work. The resulting problem created by present resources for informing troops is not that troops will behave in an undisciplined way, but that they may not take the most appropriate action for restoring order.

Criteria for Solution: There is a need to improve the quality of information and experience which can be given to troops before and during their civil disturbance duty. Improvement should be made by:

a. Providing troops with facts to permit detailed expectations about public behavior and clear indications of tactics to use when these expectations

are violated. Such facts could be provided through the present arrangements for pre-deployment briefing and daily updating of information. The problem is not a lack of channels for passing on information, but a lack of facts to pass on. Satisfying the criterion will thus depend in part on the results of data-gathering and systems studies proposed elsewhere in this report.

b. Using films in training to provide realistic illustrations of control problems and countermeasures. National Guardsmen have expressed the belief that films can show the use of tactics in a realistic context and can aid soldiers in interpreting disorderly events and their participants. Civil disturbance training films are in fact being developed, but their production and distribution should be increased and accelerated.

c. Training the individual soldier for increased resistance to the effects of provocation and harrassment from citizens. In the most recent disturbances, troops have shown great restraint when faced with actively hostile individuals, but these situations have typically involved soldiers in stationary guard positions where each man could follow the example of others. In a highly fluid and violent civil disturbance in the future, individual soldiers might have to carry out precise control procedures in more isolated and dangerous circumstances, making their actions more sensitive to harrassment. The better a soldier can withstand insults and irritations, and the greater the confidence he has in this resistance, the better he will be able to perform control tasks independently and with versatility.

d. Using game-type training simulations of small-unit experiences with civil disturbance control problems. It may not be possible to stage "practice riots" for training purposes, but it should be feasible to create problem simulations which will give the individual soldier direct experience with tactical decisions, with the viewpoints of both hostile and indifferent citizens, and with the effects his actions can have on his unit's operations.

Potential Solutions: The basic problem discussed here is how to prepare the individual soldier to apply his training in a civil disturbance. There may be equipment or specific training procedures which can radically improve this preparation, but it is not at all clear what these are. The difficult job of identifying and obtaining essential information has been discussed throughout this report. The answers to the training criteria are not ready and waiting, either, and will require research. Someone will have to design and evaluate films, stress exercises, and gaming exercises which can put across civil disturbance training more effectively. The one suggestion that can be made here is that it appears more economical to analyze troop information requirements as a single task than to wait for new training and briefing techniques to be tested one at a time.

7. Police-Military Familiarization

Problem: Civil disturbance control efforts have been hampered in the past by a lack of full coordination between military and police forces. Police have had difficulty understanding military terminology, the organization of the military command structure, the inability of military commanders to freely com-

mit their reserves to action, and the limits on a squad leader's command initiative. Although this evidence of misunderstanding comes from military sources, it seems safe to assume that there has also been some unpublicized military confusion about police policies and organization. Mutual confusion is most dangerous in decisions about assigned duties and about the use of hardware and tactics.

Criteria for Solution: The best approach to reducing police-military misunderstanding about civil disturbance control tasks is for the two forces to practice together at these tasks before disorder breaks out. In a society where military men should not participate in everyday law enforcement, opportunities for police-military familiarization should be created by:

a. Combined civil disturbance training programs for Federal, National Guard, and police officials. A prime example of such a program is the Civil Disturbance Orientation Course recently reinstituted at the US Army Military Police School. Any such program should be organized to have National Guard and police officials from the same state participate simultaneously.

b. State conferences for combined civil disturbance police planning. Such conferences could deal with questions about the coordination of command structures, National Guard involvement in apprehending and detaining citizens, levels of force to be employed, sharing of intelligence, and establishment of interorganizational communications*. Questions like these should be largely resolved in advance of any civil disturbance.

c. Combined field exercises based on simulated civil disturbance control problems. It is noted earlier in this report that there has been a lack of realism in past training for civil disturbances. Part of this problem is that police and military personnel have not had chances to practice together the coordinated effort they are supposed to display in civil disturbances. At the least, combined exercises would alert officials to coordination problems in advance.

Potential Solutions: This problem calls simply for more meetings between military and civilian control forces which can result in shared experience and shared decisions on civil disturbance control problems. There does not appear to be an immediate requirement for new tactics, hardware, or even research. However, a closer look at the criteria will show this conclusion is misleading. The content of civil disturbance training programs must have some reference to new possibilities for hardware, tactics, and combined operations. State conferences on civil disturbance planning must deal with issues that are the subject of systems studies proposed elsewhere in this report; thus, the results of these studies must be made relevant at the state, as well as the national, level. Finally, designing simulated civil disturbance problems for combined exercises (such as the operation of a collocated command post) will require the talents of a systems analyst. To create programs for police-military familiarization without such a thorough approach to their contents would be to provide only half a solution to the general problem.

*Major issues suggested by Mr. Arnold Sagalyn, ADL.

III. SUMMARY AND CONCLUSIONS

The CLOARAD Program was able to identify a number of problems and issues affecting the ability of military forces to assist in the control of civil disturbances. The Program also defined criteria and possible methods for good solutions; however, the resources of the Program did not permit specifying the exact equipment and tactics which are best-suited for handling these problems. Because enough was learned in the CLOARAD Program to designate problems, but not solutions, this report makes but two major recommendations (A and B below):

A. IT IS IMPERATIVE TO CARRY OUT SYSTEMS STUDIES IN ORDER TO DETERMINE THE BEST FEASIBLE SOLUTIONS FOR THE CONTROL PROBLEMS IDENTIFIED IN THIS REPORT. Each system study should focus on the multiple requirements for dealing successfully with a particular control problem. Each study should analyze and compare the effects of all possible combinations of hardware and tactics in a variety of problem scenarios. The systems studies will differ from the CLOARAD Program in being more focused and having more thoroughly defined requirements for data and analytic procedures. Examples of the questions for systems studies are given in the Potential Solutions section for each control problem listed in this report.

B. TO SUPPORT THE SYSTEMS STUDIES AND ANY OTHER RESEARCH ON THE MILITARY ROLE IN CIVIL DISTURBANCES, IT IS ABSOLUTELY ESSENTIAL TO UNDERTAKE A PROGRAM FOR GATHERING SELECTED CIVIL DISTURBANCE DATA FROM PRIMARY RATHER THAN PUBLISHED SOURCES. The data to be gathered should be defined in advance according to the needs of specific research programs. Major primary sources of data will include official records, supplemented by systematic interviewing. Where it is not possible to directly measure civil disturbance phenomena, indicators should be developed and used. Pre-defined and precise data requirements, plus reliance on primary sources, will be major improvements on the CLOARAD Program. Examples of likely data needs are given in the Potential Solutions section of many of the control problems identified here.

C. Based on the information obtained during the CLOARAD Program, it has been possible to identify eighteen specific control problems and to suggest both criteria for solving them and potential solutions. The problems can be summarized as follows:

1. Protection of security forces from thrown objects and gunfire. Personnel-protection equipment should permit maximum maneuverability, permit unobstructed vision, and be lightweight and damage-resistant. Vehicle protection should prevent penetration and immobilization and should allow variable and adaptable reinforcement.

2. Rapid deployment of ground forces to cope with scattered and recurrent outbreaks of disorder. A solution to this problem should treat each quick-response unit and its transportation as an integrated system and should take into account the needs for communications, aerial mobility, and use of local resources.

3. Denying rioters the advantages of darkness (such as invisibility and anonymity. Control forces should be able to control illumination according to operational requirements, to light up individuals or large areas from a distance, and to operate effectively under conditions of imposed darkness.

4. The need to augment civilian fire-fighting. The military contribution should include use of soldier-firemen who can both protect and assist civilian fire-fighters, development of a limited small-unit fire-fighting capability, and training of regular troops in proper responses to fire problems.

5. Controlling buildings with a minimum of risks, damage, and injuries. Improved formulation and application of building-control doctrine should emphasize methods for protected access, timing and police participation in building seizure, and building security after seizure.

6. Efficient use of barriers to protect property, limit riot areas, and restrict or channel public movement. Answers to this problem should be based on the development of impenetrable, well-defined, self-maintaining, non-injurious barriers which permit easy modification and which can be manned by small units.

7. Responding to sniping reports in ways that minimize violence. Responses should allow verification and precise location of shooting, varied tactics by specially-trained units to make the sniper isolated and vulnerable, and maximum protection of citizens and troops in the vicinity.

8. Counteracting hit-and-run violence. Control measures should be based on deployment of small, combined (police + military), mobile units with expanded communications facilities; on the use of graduated force; and on the encouragement of self-policing by citizens.

9. Dispersing, containing, or diverting crowds with a minimum of disorderly consequences. Troop commanders should have an increased number of options for controlling the formation, behavior, and movement of crowds in ways that maximize the chances of avoiding violence. Control options should make use of troop mobility, graduated levels of non-lethal force, selective removal of individuals, controlled dispersal, communication with the crowd, observation and identification of crowd participants, and self-policing by members of the crowd.

10. Enforcement of curfews without excessive interference with legitimate traffic. More effective curfew enforcement will depend on an improved capability to locate, identify, and intercept violators through greater concentration of manpower, better alerting of patrols and checkpoints, better methods of identifying persons on legitimate errands, and mechanically-aided detection of violators.

11. Legal and tactical difficulties of apprehending and detaining citizens. These difficulties should be eased by insuring the participation of the police, by improving the means for immobilizing prisoners, by developing better methods for recording and preserving evidence and identification, and by rapidly removing detainees to pre-arranged detention centers.

12. Shortages of complete and accurate intelligence. Military intelligence should be improved by supporting interagency intelligence-sharing at the state level, by assigning greater intelligence responsibility to troops on duty, by increasing the capability for remote surveillance of riot areas, by directly recording intelligence inputs, and by establishing channels for information from citizens.

13. Identification of riot participants so as to remove anonymity and provide intelligence and legal evidence. Identification methods should provide legal evidence of illegal activity; should be able to use portable, long-range equipment; should be conspicuous and hard to evade; should permit rapid alerting of control forces to watch for identified persons; and should produce tamperproof evidence available only to official agencies.

14. Accurately estimating the severity of disorder and the success of control efforts. Uncertainty about control requirements and effectivenss should be resolved with the help of a set of indicators which refer to the full range of control problems and responsibilities, are immediately available during a disturbance, can be compared against their pre-disturbance values, and require a minimum of effort for collection and analysis.

15. Insufficient and inadequate facilities for security-force communications in urban areas. This is particularly a problem of police-military intercommunications. The solution should involve the issue of more and better-matched equipment and better organization of communications channels to provide for interagency communications, emergency communications, and security against hostile interference.

16. Countering public ignorance and unofficial responses to it (rumors and speculative news reports) which increase the difficulty of obtaining cooperation with control efforts. Military forces should provide a steady release of information about disorder and control efforts to the press, should support the work of rumor clinics, and should have the capability to make direct announcements to the public if necessary.

17. Troop inexperience with the special situations and demands encountered in civil disturbances. To help troops put civil disturbance training into practice, they should have a background of realistic training by use of films and exercises, plus more detailed briefings on what to expect and how to respond in riot situations.

18. Misunderstanding between police and troop units about each other's missions and capabilities. Misunderstandings should be removed by on-the-job contact between police and troop leaders in combined training programs and field exercises, and in state civil disturbance planning conferences.

The problems stated and issues raised in this report are real and persistent. However, in the search for better solutions, this report can offer no more than tentative guidelines. Developing the best feasible solutions to civil disturbance control problems will require the support of detailed systems studies and extensive, selective data collection.

UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)*
US Army Land Warfare Laboratory
Aberdeen Proving Ground, MD 21005

2a. REPORT SECURITY CLASSIFICATION
UNCLASSIFIED

2b. GROUP

3. REPORT TITLE
COMPREHENSIVE LAW & ORDER ASSISTANCE RESEARCH AND DEVELOPMENT (CLOARAD) PROGRAM

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*
Final Report (Revised)

5. AUTHOR(S) *(First name, middle initial, last name)*
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6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
March 1971	77	0

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
b. PROJECT NO. 2X663701D718	TR 71-04
c.	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
d.	

10. DISTRIBUTION STATEMENT

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
The basic work reported in this document was performed under LWL Task No. 02-Y-69.	Director of Defense Research & Engineering Department of Defense Washington, DC 20310

13. ABSTRACT

The Comprehensive Law & Order Assistance Research and Development (CLOARAD) Program was concerned with hardware and tactics of potential value to military forces assigned to help control civil disturbances. The Program was a small-scale attempt to evaluate specific tactical problems and requirements imposed on military forces in disturbances. Within the restrictions of scarce data and time, manpower and funding limitations, this report delineates the most important problems identified during the Program and presents guidelines for the solution of these problems. Two firm recommendations are made in the report: (1) there should be comprehensive systems analyses to determine the best feasible solutions for the problems stated in the report; and (2) there should be a larger-scale, intensive effort to assemble and analyze pre-defined data on civil disturbances.

DD FORM 1 NOV 68 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

UNCLASSIFIED

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Riot Control						
Civil Disturbance						